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ON THE COVER: Open Wheel Action, full scale and R/C. Bottom: The big boys make their way around the Brickyard; also, Raco's 1/4-scale Indy car. (Photos by Steve Pond.) Center: Schumacher's Top Cat in action. (Photo by Rick Houle.) Top: Ricky Jordan's MTV car at the ROAR Paved Oval Nats. (Photo by Rich Hemstreet.) Craig Models SR-1 Rail Dragster. (Photo by Steve Pond.)



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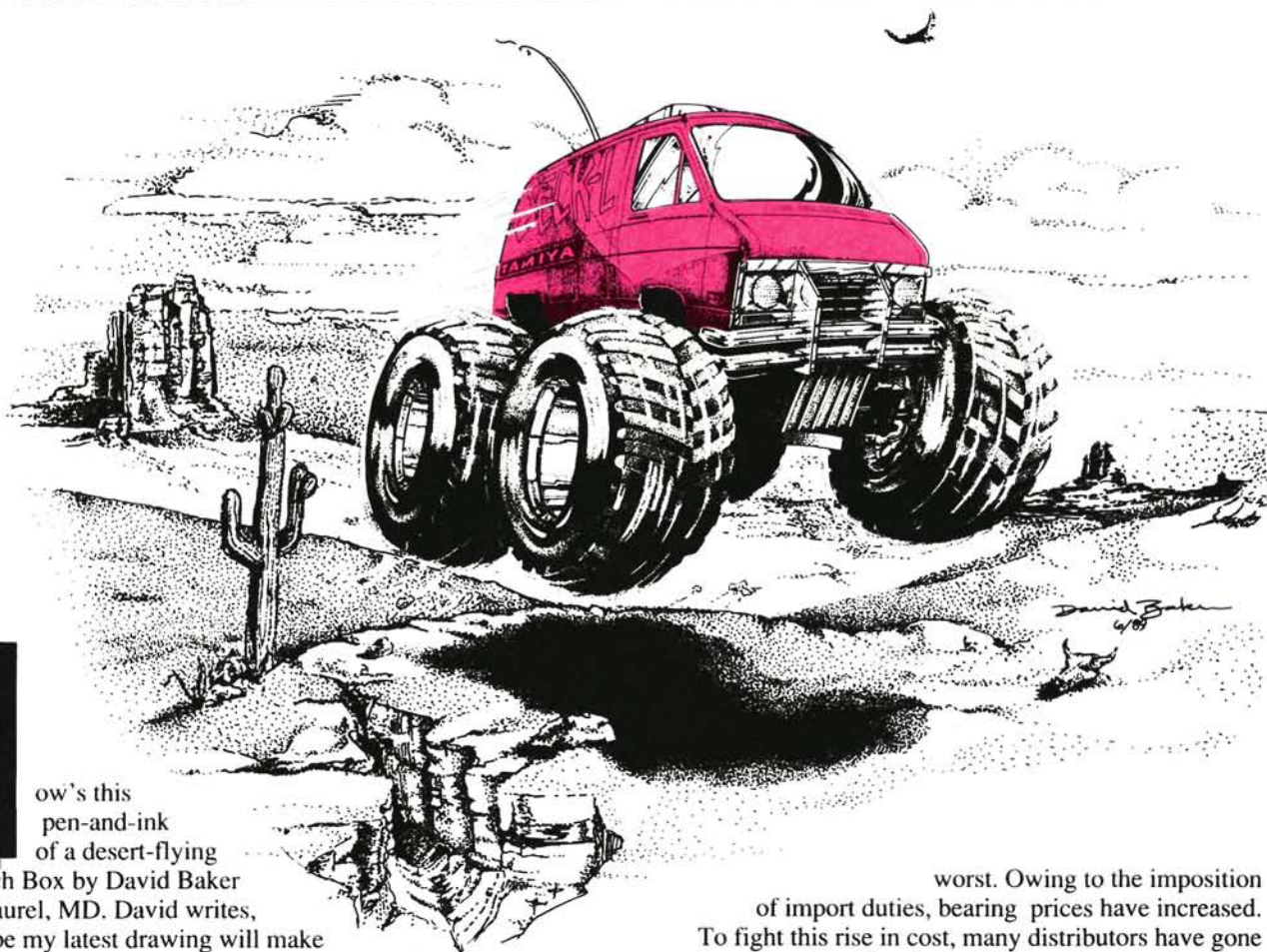
AD INDEX



SR-1, page 42

EDITORIAL

by CHRIS CHIANELLI



How's this pen-and-ink of a desert-flying Lunch Box by David Baker of Laurel, MD. David writes, "Hope my latest drawing will make it to some small corner of your excellent and informative publication." We're impressed! How's the Editorial page, Dave? Watch out! Here comes your free subscription to *Car Action*.

This is our Open-Wheel Special Issue with many articles directly relating to subjects without fenders. Rich Hemstreet reviews the New Era 1/4-scale Supermodified while Wally David takes a look at RCRC's 1/10-scale Supermodified RC10 conversion. And what would an Open-Wheel Special be without Smitty Pond's Indy 500 coverage?

There's a general assumption that certain things are created equal, or in this case, with equal attention to quality. It seems that many are under the impression that a ball bearing is a ball bearing—all created equal. Nothing is further from the truth! Bearings are graded on what's called the ABEC scale of 1, 5, 7 and 9; 9 being the best and ungraded being the

worst. Owing to the imposition of import duties, bearing prices have increased. To fight this rise in cost, many distributors have gone to a cheaper grade of bearing while keeping the price basically the same. You might have noticed how bearing tolerances have become sloppy to the point of being unacceptable, and reports of total bearing failures are on the increase. I won't spend any more time on the subject now, but I do want you to be aware of the situation until our staff can compile a report giving you more information about which are the best bearings.

In my last Editorial, I said we'd bring you an RC10 versus JR-X2 shootout, weather permitting. Well, the weather was fine, but we didn't make the deadline. I'm sorry; we'll have that shootout for you next month.

MESSAGE FROM THE AYATOLLAH OF RADIO CONTROLLA: *Too much is never enough!!* ■

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LETTERS

WHERE TO WRITE TO US

If you're writing to the editors (and we'd love to hear from you), please be sure to address your letters to "Letters," *Radio Control Car Action*, 251 Danbury Road, Wilton, CT 06897. Only subscription orders and inquiries are handled by our Customer Service Department in Mount Morris, IL; other mail addressed there must be forwarded to Connecticut, which leads to long delays.

Eagle Eye (family) of the Month

We think we found the error in the August '89 issue. On page 43, you say the 180-pound test Dacron fishing line is rolled around the rear, etc. Then in the caption you say it's 185-pound test. Enough corrections; we think your mag is the best around!

AMANDA MAUNEY, KENNETH PEEK, OLIVIA MAUNEY, L.E. HOLLAWAY, C.E. MAUNEY, JESS JENNINGS, LUCILLE HOLLAWAY, TONY JENNINGS
Ft. Payne, AL

Congratulations to all of you who seem to reside at the same address in Ft. Payne, AL. Since you all had the same correct answer, I'll let the family members fight over who should get the sheet of decals. In case any more of you are considering "stuffing the ballot box" in a similar fashion, forget it. Multiple entries from the same address will henceforth be disqualified. So sorry, but think of the money you'll save on postage!

CC

Kid Deserves an A

I'm in the eighth grade and my assignment is to write a thank-you letter. I couldn't think of anyone more worthy than you. Your magazine has given me more tips than any racer I've ever known,

and your car ratings are what I depend on when shopping for a new car. Thank you for this publication; I'll continue to buy it as long as I'm enthusiastic about the hobby/sport.

DREW MCGOWAN
Troy, OH

You're welcome, Drew. Tell your teacher that your letter was the most well-written, concise, perfectly spelled and constructed fragment of literature my eyes have ever stumbled upon. I'm contemplating employing Drew to help me with my spelling. That should get you an A, Drew!

CC

Too Hot?

I'm a beginner in the world of R/C, and

ALL YOU NEED...



I've learned a lot from your awesome mag. I have an MRC/Tamiya CPR P-100F. When I read your reports on speed controllers, you usually say they get warm. After a battery-worth's run, my controller gets so hot I can't touch it for more than one or two seconds. Is this too hot? The instructions say that it's OK to use a 8.4V battery and a compatible 540-type motor. Are these statements true? Can I use something like a Trinity motor that's not a 540 type? I'd really appreciate your help in answering these questions.

DAVID ZORC
Silver Spring, MD

David, it's hard to tell just how hot your controller is getting. A controller can be

uncomfortable to the touch and still be within a safety margin. If you often run at partial throttle and get on and off the throttle a lot, the controller will get hotter than if you were to go full throttle for the same time. If the instructions say it's fine to use an 8.4V pack, then go ahead; the manufacturer should know. I wouldn't go past a stock wind, as controllers with reverse generally can't handle the current demand of a modified motor.

CC

No 4WD RC10

After reading your Budget Boomerang article in the November '88 issue, I made the same changes to my car, and it's performed better ever since.

My friends and I would like to know if

there's a 4WD RC10 coming out soon. If there isn't a 4WD RC10, is there a conversion kit to turn the RC10 into 4WD? Keep up the good work.

JEFF CHENG
Alexandria, VA

Jeff, there's no 4WD RC10. There were rumors to that effect, but since Associated is now distributing the 4WD Yokomo C4 (now called the YZ10), it appears that they won't be manufacturing one themselves. MIP does make a 4WD conversion for the RC10, but I understand the kit isn't for beginners because it requires some machining during assembly.

CC

(Continued on page 10)



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LETTERS

Fair Production

I own a Kyosho Raider, and I enjoy reading Dick Brinton's "Budget Racer." His July '89 article said that to be competitive in the production class, the Raider must be able to turn laps in the low 9s. But in July, he said he was racing against RC10s, Ultimas, and JR-X2s!? I thought the production class was for entry-level cars, not cars that would be racing in the Worlds! Please explain.

ERIC HOWELL
Knoxville, TN

Eric, you've hit on the problem that the production class is having: The car is supposed to be raced as it comes from the factory, but cars like the JR-X2 come from the factory with graphite chassis, turn-buckle linkage, ball bearings, etc. To further complicate matters, this car comes with no motor or speed control.

Some hobby shops are starting a "plastic chassis" rule, which will disqualify the more expensive cars with graphite, fiberglass and aluminum chassis. I think this is a good start, although it can be the source of track disputes. Dick's track hasn't yet adopted this rule, but I understand the owner takes an active role in advancing racers out of the production class and into the stock class if they appear to be winning too often.

CC

Mystery Car Winner

My friend and I have the information you want on the Hirobo Engine Buster (July's "Inside Scoop"). We read an article on it in Chinese and translated it for you.

Here are the features of this factory-built, ready-to-run, 1/12-scale off-road car: 1cc (0.6) Cox engine (included); rear engine; gear-driven, rear-wheel drive; factory-built, easy-to-use pull starter; engine comes with protective cover, which also acts as a heat sink; sealed radio gear; front double independent wish-bone suspension with monoshock; rear basic design suspension; rigid axle (like the Grasshopper); 2-channel radio (also

included).

Your magazine is the best! Long live *Car Action*!

RAYMOND KWONG and PAUL LEE
Hollywood, FL

Thanks for the info on the Engine Buster, you guys; decals are on the way.

CC

Car in Toe

I'm relatively new to R/C. I purchased a Turbo Ultima, and I've been extremely pleased with this unit. However, I'm experiencing difficulty in vehicle tracking. (I can't get the darn thing to go straight). Any help would be greatly appreciated.

LARRY L. EVANS
Waterford, MI

Larry, although the Ultima doesn't have any more tracking problems than other cars do, it does have more understeer out of the box than most. Try dialing-in some toe-in on the front wheels. As viewed from the top, the front wheels should be pointing slightly inward a degree or two.

CC

Full-Scale BoLINK

I was watching Mickey Thompson's Off-Road Championships on ESPN, and I noticed a Super 1600 buggy (driven by "Jammin'" Jimmy Nichols) with BoLINK sponsorship. Does Bob Rule of BoLINK supervise such sponsorship, and does he compete by driving in such events?

JUSTIN DOBESH
Laurel, MD

Justin, BoLINK does sponsor Jimmy Nichols, and, for the past two years, Bob Rule has driven in the Mint 400 in Nevada. Bob also competes in off-road events in his home state of Georgia.

CC

Approved Batteries

I love your magazine, dudes! Simply awesome! I love all your monthly fea-

(Continued on page 12)

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(Continued from page 10)

tures, especially "Pit Tips," "Readers' Rides" and "Scoping Out." The reports on the cars are really detailed, and every month I look forward to buying your magazine and reading it cover to cover!

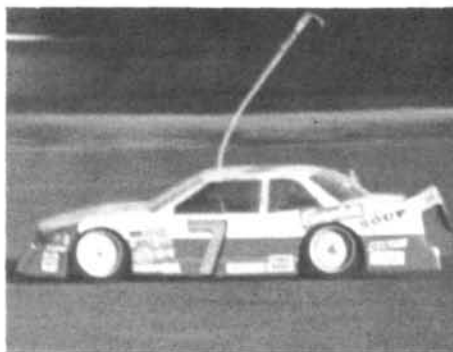
Could you tell me what the ROAR regulations say about what type of battery you can use in a stock or modified race? Is it 1200 or 1700mAh? If you're wondering why this letter is typed, I'm sitting in keyboarding class with nothing to do!

DARIN HERLE

Burlington, Ontario, Canada

Yo, dude, I'm sure your teacher could find something for you to do. Anyway, 1200 or 1700mAh battery packs are allowed in both stock and modified classes. The 1200mAh SCR packs are advised for stock because of their hotter voltage output. The 1700s are better for modified because of their longer run time. Stock class is confined to 6-cells, while modified can use 7 cells in ROAR off-road racing.

WD



On-Road Only

I'd like to congratulate you on over four years of superb work. I have a question about Wally David's April '89 article on homemade chassis. The diagram shows an on-road RC10. Does it work for an off-road RC10?

ANDY PRICE
Tallahassee, FL

Andy, thanks for the compliment; we try! I designed my homemade chassis for on-

road use with full bodies. The chassis would stick out of an off-road body (unless you use a truck body), and that doesn't look too cool! There's no reason why it wouldn't work for an off-road RC10 if you made it narrower.

WD

Car Action Encourages Reading

Your magazine is the greatest! I've always hated reading, but I always read your magazine from cover to cover. The articles are very informative. I really enjoy the hobby, but my mom thinks it childish. She hates me spending my hard-earned money on it, but she lives with it!

In past issues, I've read about complaints in the stock motor class. Our club has dealt with the problem of the super-stock motor by splitting up the stock division into two classes: the regular stock class and the speedworks class.

I'd like to see a track report on the new RC10L by Associated. Right now, I'm looking for an on-road car, and I've narrowed it down to the TRC Pro 10 and the RC10L. I've seen the track report on the TRC Pro 10, and it was impressive. I'm waiting for the track report on the RC10L. I was hoping you could help me decide.

JASON "BIG" MACK
West Columbia, SC

"Big," thanks for sharing your club's solution to the stock dilemma. Wally David will soon be doing a full track report on the Associated RC10L, so just hang on a little longer.

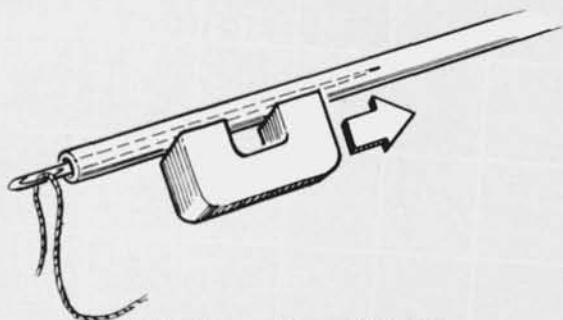
Mrs. Mack, don't be upset; at least the hobby got your son reading. Just think where he'd be without Car Action.

CC

We welcome your comments and suggestions. Letters should be addressed to "Letters," Radio Control Car Action, 251 Danbury Road, Wilton, CT 06897. Letters may be edited for clarity and brevity. We regret that, due to the tremendous number of letters we receive, we cannot respond to every one.

PIT TIPS

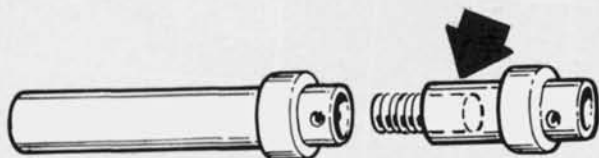
by JIM NEWMAN



ANTENNA THREADING

Here's yet another ingenious method of threading antenna wire through the tube mast. Tie the antenna wire to a piece of thread, which is, in turn, threaded through the eye of a large darning needle. Insert the needle into the mast, and, using a magnet, drag the needle up inside the tube until it comes out at the top. Now pull the thread to draw the wire out through the top of the tube, and secure it with tape or shrink tube.

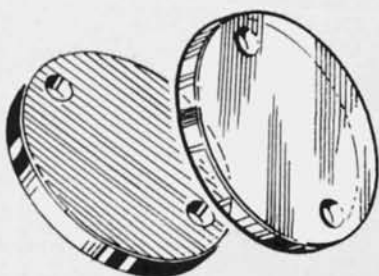
Tom Dolensky, Akron, OH



BODY-MOUNT EXTENSION

This owner devised his own body-mount extension so that he can now use bodies of different heights on his chassis. First, obtain a set of hollow body-mount tubes (e.g. Parma's). Determine how much higher the extensions need to be, and cut tubes to that length. Then thread a short piece of threaded rod into the extension, along with a drop of CA. Cross-drill the top for the body clip, and the extension mount is ready to be screwed into the original mounts.

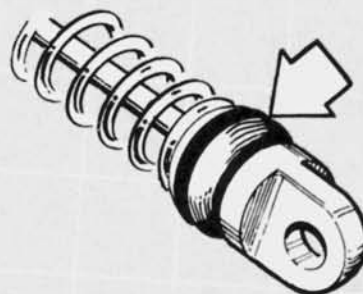
Tim Kiemle, Fairhaven, NY



SEE-THROUGH MOTOR CAP

David discarded the regular opaque plastic Tamiya motor cap after first making a copy in clear plastic. The see-through cap enables him to see if the pinion gear meshes properly with the counter gear, and when used with modified motors, it makes gear swapping much easier.

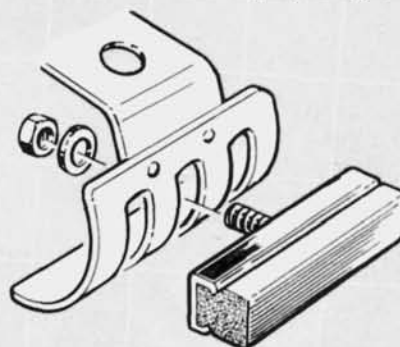
David Lee Sealey, Newport News, VA



INCREASED SPRING RATE

When a Grasshopper is run over rough terrain, the stock springs tend to bottom out. The solution? Buy some Radio Shack No. 64-302 rubber grommets; disassemble the dampener, and slip the grommet over the retainer, followed by the spring. Screw the rod back onto the retainer at full tension, and the spring action becomes slightly harder. The grommet also serves as a rubber buffer.

Kevin Rayfield, Cobourg, Ontario, Canada



RESILIENT BUMPER

The RC10's motor guard is sensitive to rear-end collisions. To minimize the damage, bolt a standard bicycle brake pad to the guard; the rubber block dissipates some of that energy without damaging the guard.

Chad Klosiewski, West Jordan, UT

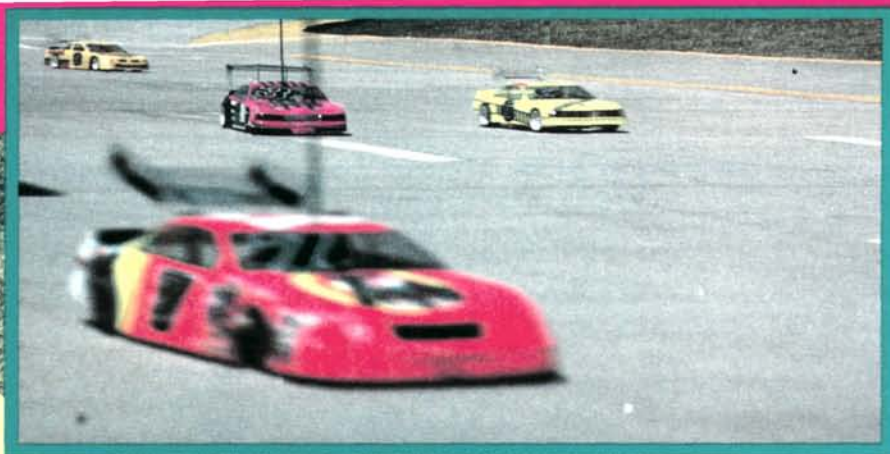


PARTS ORGANIZER

It's always difficult to keep track of loose parts when assembling a kit. To make it easier, transfer all the bagged parts into clear plastic 35mm film containers (the Fuji containers are ideal), and then tape the label from the bag onto the appropriate container. Sure beats fighting plastic bags, on which the parts tend to get snagged when you try to remove them.

Randy Rodgers, Bremerton, WA

(Continued on page 22)



R/C HOBBIES' HIGH-BANKED Peachbowl oval track in Snellville, GA, was the site of the '89 ROAR Paved Oval Nationals, where nearly 300 racers converged in search of four national titles. Radio Control

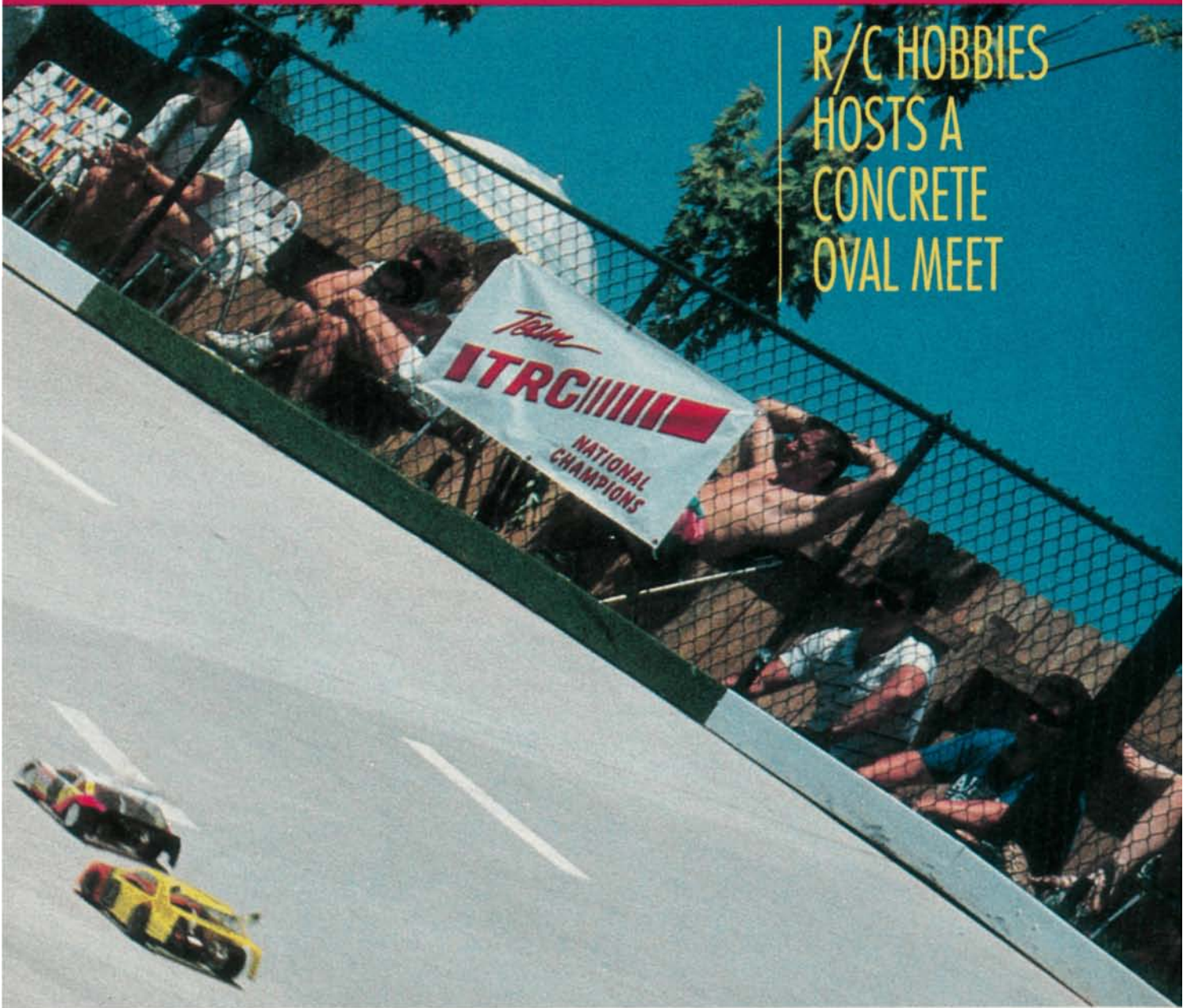
Car Action, TRC and BoLINK co-sponsored this second annual combined event for 1/10- and 1/12-scale cars.

The Peachbowl is a "short" 305-foot-long concrete oval with tight, high-banked turns connecting long, smooth straights. To get around the Peachbowl quickly requires backing off and setting up properly for the turns; you can't drive this oval at full-throttle all the way. Modified and stock classes were run in each scale, and Kyosho Super Stock 34-degree motors were the handout motor for both stock classes. Us-

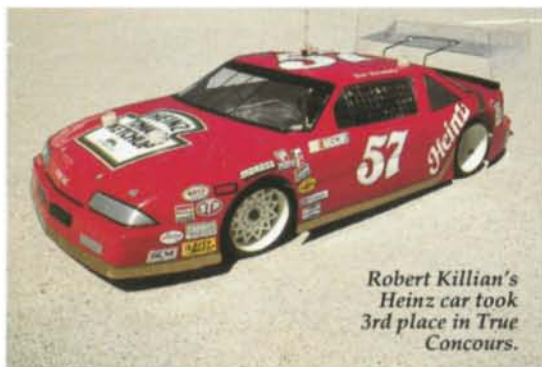
ROAR PAVED OVAL NATIONALS

by RICH HEMSTREET

R/C HOBBIES HOSTS A CONCRETE OVAL MEET



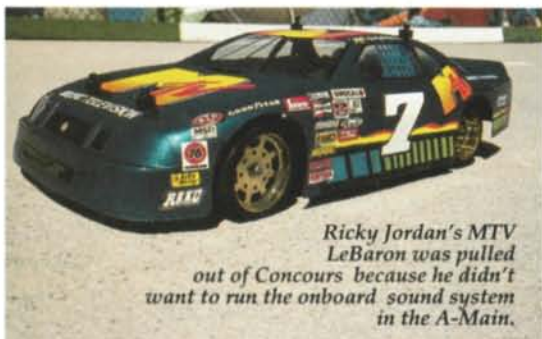
PAVED OVAL NATS



Robert Killian's Heinz car took 3rd place in True Concours.



Davey Allison's Havoline T-Bird won 1st place in True Concours for Frank Tammaro at the Nationals.



Ricky Jordan's MTV LeBaron was pulled out of Concours because he didn't want to run the onboard sound system in the A-Main.

ing a Super Stock 34-degree motor, local driver Ricky Jordan had set the $1/10$ -scale stock track record two weeks before the Nationals. With 141 entries, the $1/10$ -scale Stock Class had the largest number of racers, and the $1/10$ -scale Modified Class drew 115 entries. A total of 41 drivers entered the $1/12$ -scale Modified Class, while only 27 drivers chased the $1/12$ -scale Stock Class title. Under ROAR rules, the $1/10$ -scale cars used 6-cell battery packs and ran 4 minutes. The $1/12$ -scale cars also used 6-cell battery packs, but they ran 5-minute races.

In NASCAR, CART and Formula 1, the fall is known as the "silly season," because drivers announce that they'll switch teams for next year. These announcements seem to be made earlier every year as the top drivers try to secure the best equipment they can. Invariably, a domino effect occurs as other drivers seek to fill any seats that are vacated. In R/C racing, there seems to be a constant "silly season," as almost every major event reveals a driver change. At the Peachbowl, Joel Johnson returned to the Trinity team while running a Composite-Craft Lynx II in $1/10$ -scale, and Bill Jeric switched to a McAl-

lister Outlaw as a team driver.

Kent Clausen was the $1/12$ -scale Modified Class TQ with a 59-lap run. His Reedy-powered Associated 12L was a full lap quicker than Tony Neisinger's, whose TRC Pro 12, powered by a Trinity motor, was a full lap ahead of the third-fastest driver, Bud Bartos. Bartos' Cam-powered TRC Pro 12 was, in turn, one lap ahead of Bob Hall's Fantom-powered 12L. It's unusual to find such a large spread in the top four qualifiers' times at a national event.

Michael Murphy ran 52 laps with his Associated 12L to TQ the $1/12$ -scale Stock Class. Hoyte Stacey was 2.5 seconds behind with his 12L, and Cliff Guest captured third fastest with a TRC Pro 12. (Guest missed a 52-lap run by .7 seconds.)

Kevin Lanier, driving a BoLINK Eliminator LTO, TQ'd the $1/10$ -scale Stock Class with a 42-lap run in 4:02.1. Paul Kelley, who was the second fastest driving a TRC Pro 10, was 1 second behind Lanier. Matt Cupka, driving a Composite-Craft car, was third fastest. Each top five $1/10$ -scale Stock qualifier turned 42 laps.

Bob Hall was able to complete 47 laps in 4:04.8 to earn TQ honors in the $1/10$ -scale

ROAR PAVED-OVAL WINNERS CHART

1/12 STOCK

Fin	Qual	Name	Chassis	Motor	ESC	Tires	Body
1	1	Michael Murphy	Associated	KYOUSHO SUPERSTOCK	Tekin	TRC	McAllister
2	2	Hoyle Stacey	Associated		N/A	TRC	BoLINK
3	3	Cliff Guest	TRC		Novak	TRC	BoLINK
4	6	Stephen Minea	Associated		Novak	Twinn-K	BoLINK
5	10	Bill Worrel	Scratch		Novak	TRC	BoLINK
6	8	Doug Shirley	Associated		Novak	TRC	BoLINK
7	7	Steve Rule	BoLINK		Novak	BoLINK	BoLINK
8	9	Joe Goodwin	BoLINK		Tekin	BoLINK	BoLINK
9	5	John Walters	Associated		Tekin	Twinn-K	N/A
10	4	Chad Jeffrey	Corally		Victor	TRC	Parma

1/12 MODIFIED

Fin	Qual	Name	Chassis	Motor	ESC	Tires	Body
1	1	Kent Clausen	Associated	Reedy	Novak	Associated	McAllister
2	3	Bud Bartos	TRC	Cam	Novak	TRC	BoLINK
3	2	Tony Neisinger	TRC	Trinity	Novak	TRC	McAllister
4	6	Chris Doseck	CompCraft	Trinity	Novak	TRC	BoLINK
5	4	Bob Hall	Associated	Fantom	Novak	TRC	BoLINK
6	7	Terry Rott	CompCraft	Cam	Novak	TRC	BoLINK
7	8	David Timmerman	TRC	Cam	Novak	BoLINK	BoLINK
8	5	Carl Christy	Associated	Reedy	Novak	Associated	Associated
9	10	Jim Dieter	TRC	Revtech	Novak	TRC	BoLINK
10	9	Frank Killiam	TRC/Killiam	Checkpoint	Novak	TRC/BoL	McAllister

1/10 STOCK

Fin	Qual	Name	Chassis	Motor	ESC	Tires	Body
1	1	Kevin Lanier	BoLINK	KYOUSHO SUPERSTOCK	Novak	BoLINK	BoLINK
2	4	Ricky Jordan	BoLINK		Novak	BoLINK	BoLINK
3	6	Alan Fetta	TRC		Novak	TRC	BoLINK
4	2	Paul Kelley	TRC		Novak	TRC	BoLINK
5	9	Rodney Miles	Scratch		Tekin	TRC	BoLINK
6	3	Matt Cupka	CompCraft		Novak	TRC	BoLINK
7	5	Jay Bowman	Adv RacTech		Novak	TRC	Andy's
8	8	Chuck Massey	PRC		Novak	BoDonna	BoLINK
9	10	Nick Cacciola	MRP		Novak	TRC	MRP
10	7	Jill Simms	CompCraft		Novak	TRC	BoLINK

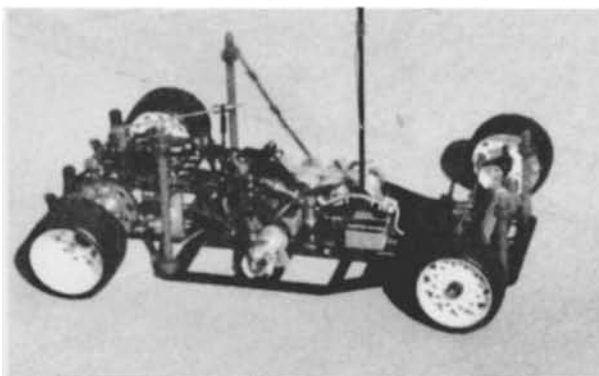
1/10 MODIFIED

Fin	Qual	Name	Chassis	Motor	ESC	Tires	Body
1	3	Terry Rott	CompCraft	Cam	Novak	TRC	BoLINK
2	2	Tony Neisinger	Scratch	Trinity	Novak	TRC	McAllister
3	5	Kent Clausen	Associated	Reedy	Novak	Associated	Associated
4	1	Bob Hall	CompCraft	Fantom	Novak	TRC	Associated
5	8	Joel Johnson	CompCraft	Trinity	Novak	TRC	BoLINK
6	4	Tim Lanier	BoLINK	Cam	Novak	BoLINK	BoLINK
7	10	Chris Doseck	CompCraft	Trinity	Novak	TRC	BoLINK
8	6	David Timmerman	CompCraft	Cam	Novak	TRC	BoLINK
9	9	Bud Bartos	BoLINK	Cam	Novak	Twinn-K	BoLINK
10	7	Craig Kelley	TRC	Trinity	Novak	TRC	BoLINK

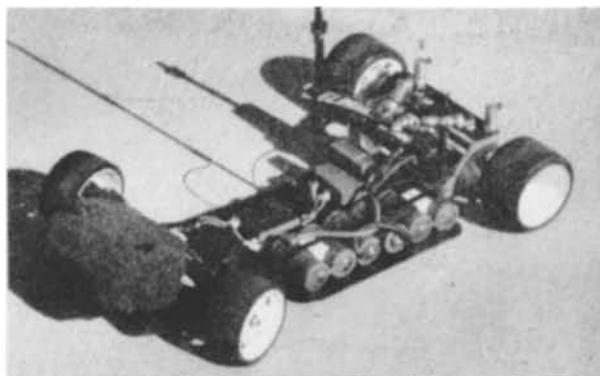
Modified Class with his Fantom-powered CompositeCraft Lynx II. As in the 1/12-scale Modified Class, Tony Neisinger was second fastest in the 1/10-scale Modified Class. Neisinger's Trinity-powered machine was only .5 second behind Hall. Driving a Cam-powered CompositeCraft Lynx II, Terry Rott captured the third starting position.

Concours were held before the Mains began on Sunday morning. After the usual jousting over rules, it was decided that the top three drivers in Best Paint and in True Concours had to run their cars "as judged" in their Main. This caused several entrants to set their cars aside. Ron Crawford won Best Paint with a sharp red and gold paint job. Richard Carpenter took 2nd with an orange and blue No. 1 car, and Frank Tammaro's 1/12-scale Force 1 car captured 3rd place. Tammaro's 1/10-scale No. 28 Havoline T-Bird won the True Concours Class. Joe Gallo's No. 7 Zerex car placed 2nd in True Concours, and Robert Killian's Heinz 57 earned a 3rd-place trophy.

The A-Mains were the last races on Sunday afternoon, and first up was the 1/12-scale Modified Class. Kent Clausen's bright-orange Tide car blasted around the track as though it had 7 cells, not 6. Clausen's driving was equally as impressive as he cut a clean path through the traffic. When the



Terry Rott's Modified A-Main-winning Lynx II ran five cells on the left side of the car and one cell on the right.



Kevin Lanier captured 1st place in the Stock A-Main with his LTO BoLINK Eliminator.

RADIALS OR RECAPS?

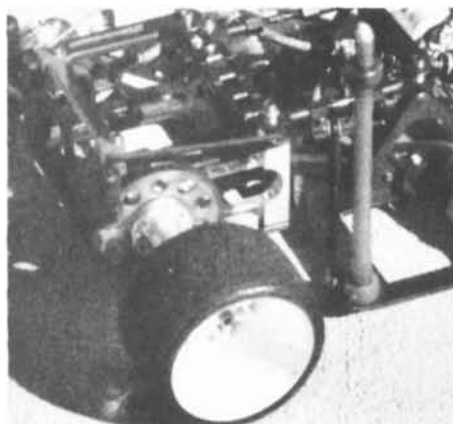
TIRE TECHNOLOGY FOR 1/10-scale on-road racing took a major step forward at the Oval Nationals. TRC had hundreds of its so-called "Morton Radials" on hand at R/C Hobbies. These tires have a rubber cap, or band, glued to a carefully crowned foam tire. The cap is made of the rubber used for full-scale racing tires, and, under racing conditions, the rubber warms up and becomes very tacky. These tires offer less rolling resistance than the foam tires that are usually used for on-road racing, so they run faster and longer than standard foams do.

BoLINK also had capped tires for its team. The caps were bought from TRC and glued in place by BoLINK. Rick Jordan of BoLINK warned racers that these new tires (TRC or BoLINK) had to be properly broken in. The temperature was in the mid 80s, so brand-new radials had to be run hard for four or five laps and then pulled off the track and cooled off with a damp rag. When the wheels were cool, this procedure was repeated three more times. Under cooler conditions, these tires can be broken in during racing: Simply run the car fast for 4 minutes, and the tires are ready.

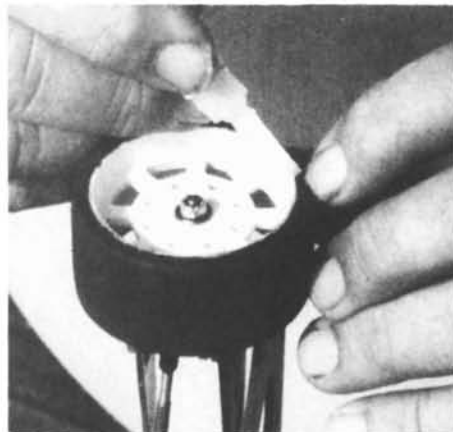
Of the 20 cars in the two 1/10-scale A-Mains, 17 ran either TRC radials or BoLINK's capped tires. Chuck Massey used some homemade recaps on his PR-7 in the 1/10-stock A-Main. He glued rubber similar to a bicycle inner-tube to BoLINK foams that he had ground down. Kent Clausen ran the Associated "black" rubber that's usually used for 1/8-scale tires. Bud Bartos used Twinn-K's new A.J.'s Black Dot rubber tires, which also have their roots in 1/8-scale gas racing. Not a single standard blue-, green- or orange-foam tire was run in the 1/10-scale A-Mains.

Technology has its price, however: TRC's tires cost \$80 for a set of four, and Twinn-K's tires sold for \$40 for a full set. Occasionally, the TRC and BoLINK caps came off the tire because the glue overheated. Other racers blistered tires because they didn't break them in properly, so destroying their investment.

TRC and Twinn-K already have their new tires on the market, and BoLINK expects to have its capped rubber tires available shortly. In the meantime, the debate continues: Is this the direction in which R/C racing should be going? Time will tell. ■



TRC's new tires were definitely the major topic of discussion at the ROAR Oval Nationals, and they proved to be the hot setup for the Peach-bowl.



The new rubber-capped tires should be checked after each run to be sure the edges stay glued down.

dust had settled, Clausen was the new 1/12-scale Modified National Oval Champion. Clausen's Reedy-powered Associated 12L finished a full lap ahead of the 2nd- and 3rd-place cars. Bud Bartos captured 2nd with his TRC Pro 12 that was powered by a Cam motor, and Tony Neisinger finished 3rd with his Trinity-powered TRC Pro 12.

Next up was the 1/12-scale Stock Class. Even under the pressure of trying to win a national championship TQ, Michael Murphy was able to beat his TQ run by 2.2 seconds for a one-lap victory over Hoyte Stacey. Both Murphy and Stacey drove Associated 12Ls. Driving his TRC Pro 12, Cliff Guest held on for 3rd place, two laps off the winning pace.

In the 1/10-scale Stock Class A-Main, Kevin Lanier was chased to the finish line by the stock track record-holder, Ricky Jordan. Lanier's 42-lap, 4:01.5 run was .6 second quicker than his TQ time. Jordan was the only other driver to finish with 42 laps. Both Lanier and Jordan drove BoLINK Eliminator LTOs. Alan Fetta, driving a TRC Pro 10, moved up from 6th on the starting grid to finish in 3rd place.

The final race of the weekend was the 1/10-scale Modified A-Main. Unlike the 1/12-scale Modified A-Main,



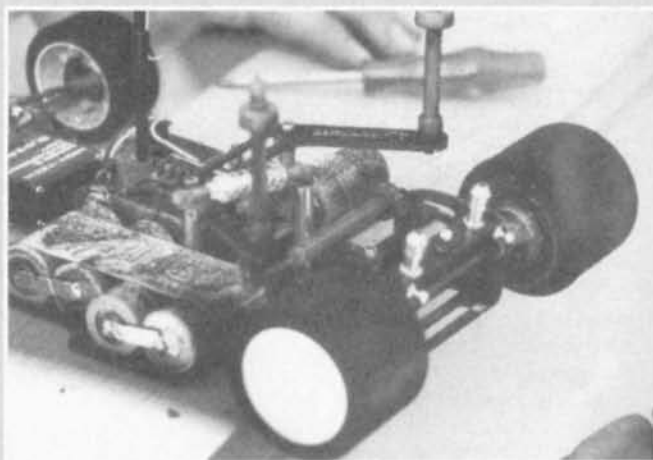
Akira Kogawa designed this front body brace that Kent Clausen used inside his 10L's body.

this race had many different leaders. Even some drivers that didn't lead the race challenged for the lead. The race finally boiled down to a three-way battle between Terry Rott, Tony Neisinger and Kent Clausen. These three drivers finished 3.5 seconds apart, each with 47 laps. Rott, who drove a Cam-powered Composite Craft Lynx II to a 1.5-second victory over Neisinger, won the National Championship he had chased for so long. Neisinger's Trinity-powered car finished 2 seconds ahead of Clausen's Reedy-powered Associated 10L.

R/C Hobbies did an excellent job hosting its first-ever national event. Its facility is top-notch, and an excellent staff handled the race. The Peachbowl itself is a great "little" track to race on. I hope that many more national-level races will take place in Georgia ■



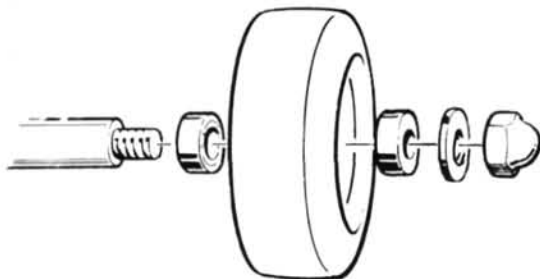
The new Lynx II car from CompositeCraft has a very sophisticated rear suspension system. So far, the new design has proven to be very competitive.



CompositeCraft's new 1/12-scale car after the A-Main. Notice the amount of tire dust that collected on the chassis after only five minutes of racing on foam tires at the Peachbowl.

PIT TIPS

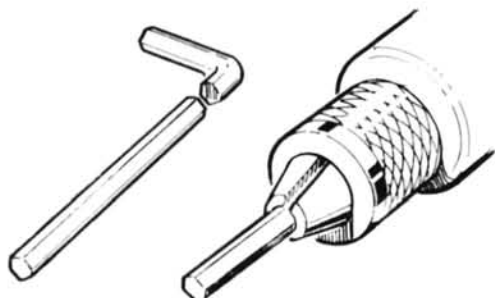
(Continued from page 14)



BOLINK TIRES ON TAMIYAS

BoLINK front tires can be mounted on the front wheels of Tamiya cars if used with Tamiya No. 850 metal bushings or bearings pushed into the BoLINK front wheels. The fit might be a little tight, but the BoLINK wheels can then be mounted on the Tamiya front axles, using the Tamiya thrust washers to shim the wheels, which are a little narrower than Tamiya's own.

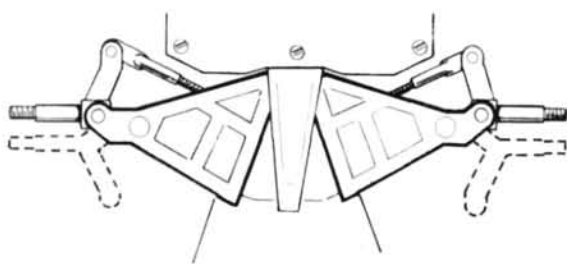
Norman Houck, Paradise, PA



POWER-DRIVEN ALLEN KEYS

Speed up your pit work by cutting off the 90-degree bend of your keys. This enables you to insert them into the chuck of a cordless electric screwdriver, thus expediting screw removal. This can also be done with Phillips-head screwdrivers.

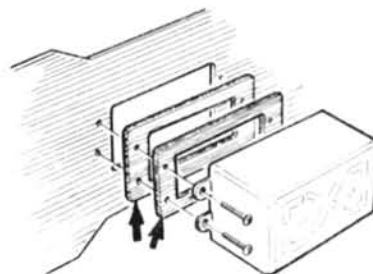
Stephen Beltzner, Oakville, Ontario, Canada



TIGHTER-TURNING PUMPKIN

Remove the A-arms from your Midnight Pumpkin and swap them to the opposite sides so that the steering blocks and the tie rods are now in front of the shocks. This will give the tires more clearance at their trailing edges and allow the wheels to have more deflection. To prevent them from rubbing on the chassis when turning sharply, make adjustments on your controller. The dotted lines show the original location of the steering arms before they were switched.

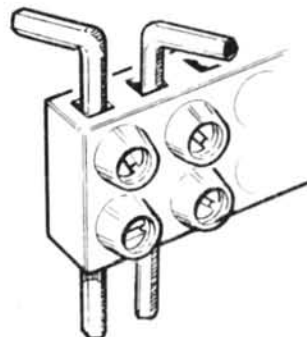
Jeff Zbyrowski, Hobart, IN



VOLTAGE BOOST FOR CLOD BUSTER

To improve the performance of his Clod Buster, Matthew found a way to fit it with an 8.4V battery. He discarded the plastic spacers C5 and C9, and by doing this, he made enough room for the battery. For a good fit, a couple of plywood shims are advisable (arrowed); you'll also need slightly longer screws to keep the battery box in place.

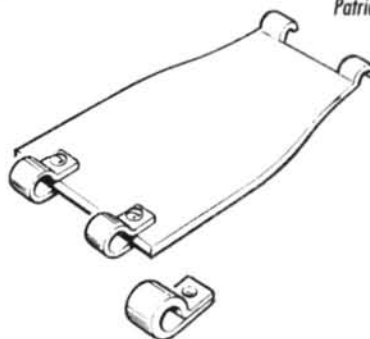
Matthew Simons, Poeking, W. Germany



ALLEN-KEY STORAGE

Keep your Allen keys handy and secure by gluing a Radio Shack terminal strip to the side of your toolbox (hot-melt glue works well). Now you can drop the keys into the wire slots, and when it's time to go home, twisting a terminal screw with a screwdriver will secure each key in place until next time. This way, you won't have to fumble for keys among the junk and peanut-butter sandwiches.

Patrick Couly, Ft. Myers, FL



BOOMERANG BATTERY DOOR FIX

If the front tabs break off the battery door, it can be speedily fixed. First, pick up some two-wire plastic cable clips from Radio Shack. Trim off any part of the tabs that remains on the door, and put the door back onto the car to use as a guide while drilling holes for the retaining screws. Then attach the nylon clips using small machine screws (2-56 should do), nuts and washers.

Gary McCool, Harrisville, PA

Radio Control Car Action will give a free one-year subscription (or one-year renewal if you already subscribe) for each idea used in "Pit Tips." Send rough sketch to Jim Newman, c/o Radio Control Car Action, 251 Danbury Rd., Wilton, CT 06897. BE SURE YOUR NAME AND ADDRESS ARE CLEARLY PRINTED ON EACH SKETCH, PHOTO AND NOTE YOU SUBMIT. Because of the number of ideas we receive, we cannot acknowledge each one, nor can we return unused material.

READERS' RIDES

Welcome to "Readers' Rides"! We continually receive photos of readers' latest projects, so we've decided to start featuring some of the more innovative stuff to give all our readers a glimpse of these neat cars and trucks, etc. So here we go! If you want to be part of this new feature, send us a nice color photo of your project with a brief description, and we'll show it to the Ayatollah of Radio Controlla at the next editorial meeting to see if he'll publish it!

If we publish your photo, we'll give you a one-year subscription to RCCA, or extend your existing one, and you'll even be eligible for our "Readers' Rides Car of the Year Contest" in the fall of '89. Send your photos to Readers' Rides, R/C Car Action Magazine, 251 Danbury Road, Wilton, CT 06897.

SWEET SPRINTER

For you 1/4-scale open-wheel lovers, here's Roy Murray's Hershey's Ice Cream Sprint Car. Roy modeled this car after the full-scale Hershey's Sprinter that frequents his neighborhood in Braddock, NJ, selling ice-cream sandwiches. We don't believe it for a minute; we've only seen Good Humor Sprint Cars in our neck of the woods.



LOOKING FOR TROUBLE

Here's a reader's ride that will make Dirt Digest's Bill "Bad Brain" O'Brien green with envy. It's Augustin Escamilla's 1 1/2 Clod Buster terrain terror: the Six Foot. This 6WS, 6WD monster sports a tilt hood and a tilt bed plus a Hydro Zeta speed control to serve all three motors. Augustin is from Modesto, CA. Car Action will investigate further.



TO INDY WITH SPARE PARTS

Rob MacEwen of Huntington Beach, CA, combines a homemade aluminum chassis with Andy's A-arms, McAllister Lowering Kit and Lunsford titanium tie rods to build his Miller American Indy Car. Rob modifies many aluminum chassis by cutting lightening holes in them, and he gives them to the younger club members to start a 1/10 Indy Class. Way to go, Rob!



INDY WIZARDRY

Another open-wheel fan is Jeff Hofer from Sunnyvale, CA, with the Tamiya Road Wizard he modified to look like an Indy car. He modified the body by adding the winglets and gas-tank valve. The driver was molded and vacu-formed to scale. The rims are machined-aluminum inserts, and the graphics were done by hand.



FLY RIGHT

Thanks to Russ Toy of S.S.F., CA, for the good photo of how *not* to fly right. Don't worry, you still get your free subscription, but straighten out your act, mister!



TOO MUCH IS NEVER ENOUGH

This 48-cylinder aberration was created by Kevin Potts. Obviously, Mr. Potts likes lots—at least when it comes to engines: this puller has six of them! To each of the engines, Kevin added a distributor, blower belts, spark plugs, gears and paint. The mostly scratch-built puller uses Clod Buster rear wheels and 1/10-scale Tamiya fronts.



'57 HEAVEN

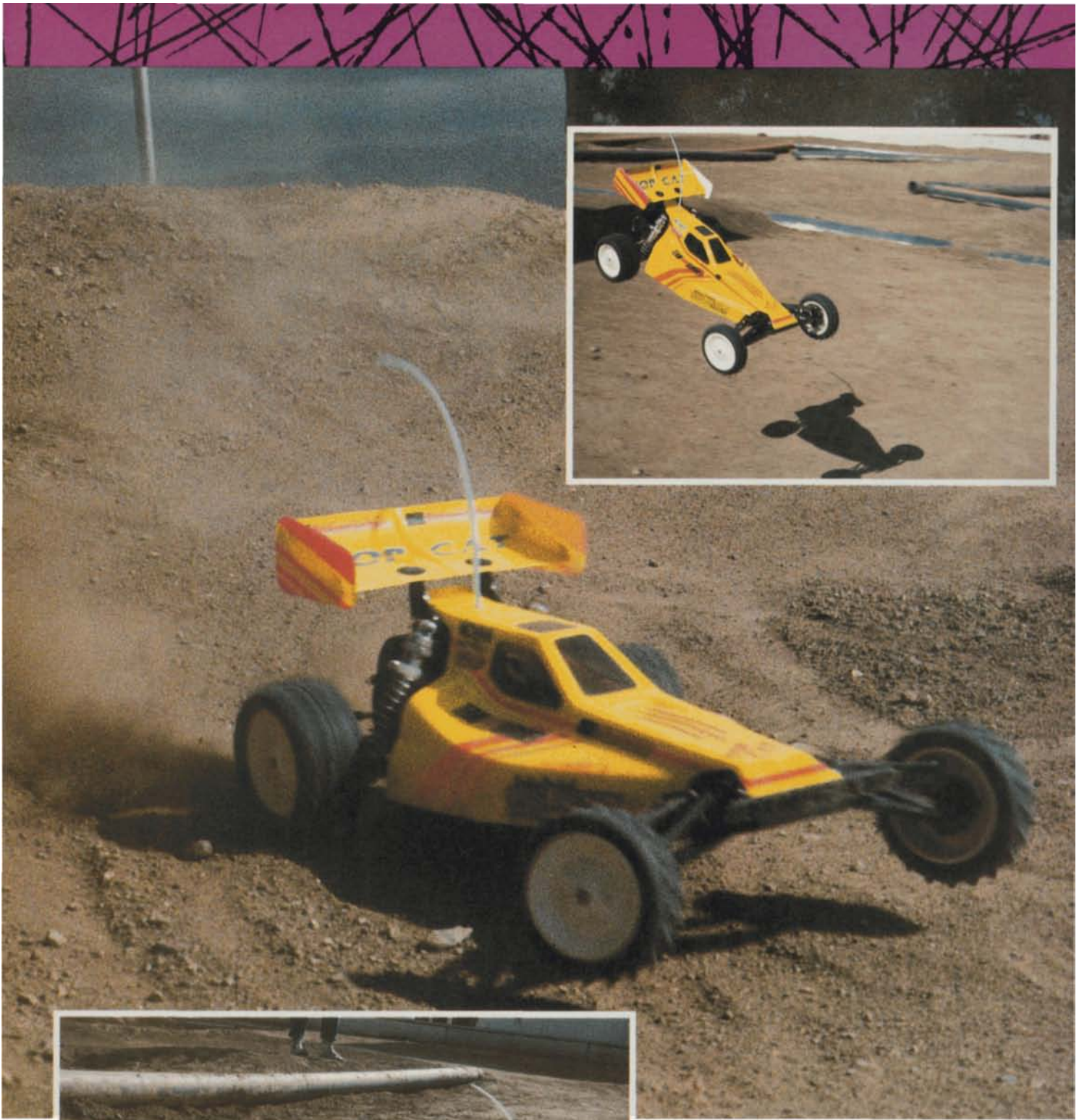
This oldies favorite was built and given a Concours-winning paint job by Tom Cwynar from Moreno Valley, CA. The '57 Chevy Parma body sits on a BoLINK Eliminator 10 chassis, and it's motivated by Revtech. Tom tells us that it recently won 1st-place Concours on "Legends '89" night at Bob and Jim's RC World in Riverside, where close to 40 cars usually compete.



DO THE JOB WITH A SUPER MOD

Steve Schneider from Waverly, OH, quickly converts his BoLINK Invader into an open-wheel oval animal by adding an MRP Super Modified body. Kyosho red shocks have been added to the optional independent rear suspension (Invader O.R.). When Steve feels like fenders, he switches to a Firebird Wedge.





JUST LIKE medieval jousting tournaments where the king pit his knights against those of powerful adversaries, so, in the R/C marketplace, manufacturers of R/C cars pit their best “knights” against one another to earn “world’s best” bragging rights.



SCHUMACHER TOP CAT

"CAR ACTION" UNVEILS THE CAT

TRACK REPORT



by RICK HOULE

tional level, Losi has high hopes of jousting at the 1989 World Championships in Australia. Now, as combatants in all camps prepare for this tournament, which is held on alternate years, a new contender has thrown down its gauntlet.

Schumacher Racing Products Ltd., of Northampton, England, has unveiled its new knight, the Top Cat. Distributed in the U.S. by Trinity* and TRC*, the Top Cat has some extremely unorthodox design features.

It's available here in only very limited quantities and is already shrouded in mystery and the cause of much debate. Almost every aficionado I've asked about this car

quickly dismissed it as having an over-engineered chassis that "doesn't work"—even though most of these folks had never *seen* the car, let alone driven one. Most controversial are the Cat's "lay-down" front shocks and its belt-drive transmission.

THE KIT: The Cat isn't easy to build, and a beginner would be wise to seek the help of an experienced car builder before tackling it. With so many first-off-the-line kits, manufacturers have an

In the off-road tournament, Associated* sent its knight—the RC10—into battle against what turned out to be only “peasants,” but, at the 1987 Worlds, Kyosho’s* Ultima challenged it and won the crown. In ’88, Losi’s* JR-X2 entered the fight, and, having done well on the na-



SCHUMACHER

TOP CAT

Type Off-road buggy
Scale 1/10
Sug. Retail Price \$225

DIMENSIONS:

Overall Length 15.5 inches
Width 9.25 inches
Height 7.5 inches
Wheelbase 11.125 inches
Front Track 8.25 inches
Rear Track 8 inches

WEIGHT:

Gross (w/bat.) 52 ounces

BODY:

Type Off-road buggy
Material Polycarbonate

CHASSIS:

Type Pan
Material Aluminum

DRIVE TRAIN:

Type (pri./sec.) Pinion-spur/Belt drive
Differential Ball type
Bearings Ball bearings

SUSPENSION:

Front: Type Independent upper and lower A-arms
Dampening Coil-over, oil-filled shocks
Rear: Type Independent A-arms w/adjustable upper links
Dampening Coil-over, oil-filled shocks

WHEELS:

Front: Type Plastic one-piece
Dimensions (DxW) 2x.875 inches
Rear: Type Plastic one-piece
Dimensions (DxW) 2x1.25 inches

TIRES:

Front Two-row coned knobs
Rear Four-row pin spikes

ELECTRICS:

Motor None

OPTIONS AS TESTED:

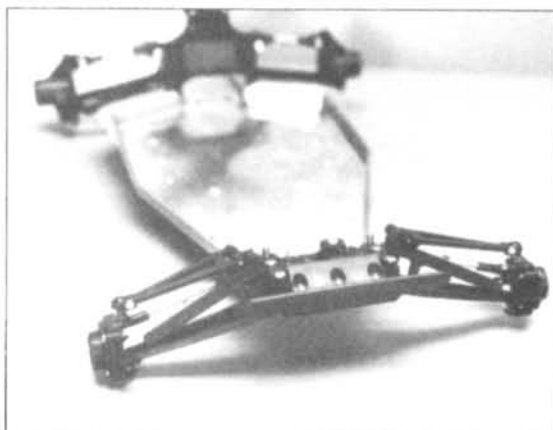
Airtronics XL-2P radio, Novak T-4 electronic speed control, NER-2X, 27-band receiver, NES-1A servo, Twister Super Stock motor, Sanyo SC 7.2V battery pack.

COMMENTS:

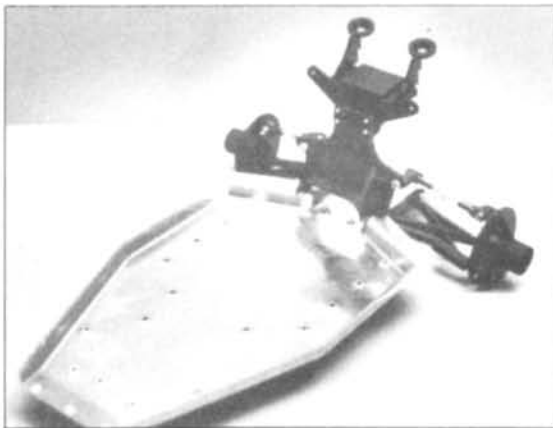
With a few mods, the Top Cat can be a serious threat to any 1/10-scale off-road race car. The biggest problem the Top Cat faces is the difficulty of finding replacement parts.

TOP CAT

unfortunate tendency to leave out parts and print poor instructions, and this is true of the Cat. A few critical parts were missing from my kit, and road tests were delayed for a few weeks while I waited for them to be delivered. This type of problem can make unwary builders do a good deal of backtracking as they zealously try to get the car "out there." We can excuse the manufacturers as long as they try to



The Top Cat's front suspension appears normal at this point, before the in-board shocks are installed.



The rear suspension is attached to the aluminum chassis and rear body/wing mount.

solve these problems as soon as they show up.

The Top Cat's packaging is rather impressive: A colorful box contains all the components packed tightly and neatly. The kit provides a complete rolling chassis based on an aluminum-pan design,

tires, wheels, coil-over oil-filled shocks, motor protection cover and front bumper. A clear polycarbonate body comes complete with a driver, die-cut self-adhesive window masks and a large, off-road wing with side dams.

The kit (No. U405) takes about five hours to assemble, and you'll need the usual selection of tools: pliers, screwdrivers, a hobby knife, Allen wrenches, a file, etc. You'll also have to buy: a 2-channel radio, a receiver, a steering servo, a speed control (preferably electronic), a 7.2V battery pack and a motor. As well as these, you should have some thread-locking compound, shock oil, polycarbonate paint and a tube of silicone sealant.

ASSEMBLY: The first seven pages of instructions deal with the front and rear suspensions and the shocks. The aluminum pan has a very low-profile design with shallow side rails only 1/2 inch high. Its natural-aluminum finish contrasts smartly with the black bulkheads and suspension parts. The rear A-arms are mounted to the chassis with small pivot blocks. The furthest rear blocks control the arms' degree of toe-in, which can be increased by adding washers (as shims) between the blocks and the chassis.

This kit contains 10 rather large (approximately 5/8 inch) ball-raced bearings that are grease-packed instead of oil-filled (as is more usual), and have rubber dirt seals that can be removed for cleaning and repacking. Owing to the grease packing, these bearings don't spin freely, but rather smoothly and deliberately, and their beefy look and feel suggests that they'll last a long time.

The shocks are the most familiar components of the kit, as they resemble those from Associated and Kyosho. Two brass bushings are installed in each shock body,

(Continued on page 32)

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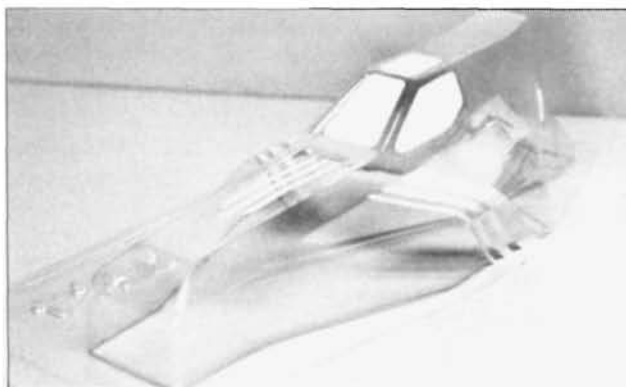
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TOP CAT



*Before painting the
buggy body, the stripes
were taped off on the
inside.*

and they're almost identical, but part No. T158 has an extra flange and part No. T159 doesn't. In my kit, I found two surplus T158s, but was missing two T159s, so I milled off the flange on the two extra T159 bushings and installed them successfully in the shocks.

On all four shocks, spring rate is controlled with plastic spacers (ranging in size from 1mm to 8mm) that snap on and off. (Sixteen spacers are provided in the kit.) Knowing beforehand that I would undoubtedly lose these little beggars in my pit box, I installed a set of CRP* adjustable shock collars designed for the RC10 shocks. These collars allow you to dial-in the shocks a lot more effectively, and they prevent you from losing them too easily. Shock oil isn't supplied in the kit, and the instructions just recommend that you run oil of the lightest possible viscosity allowed by track conditions. Start with 20WT oil; then adjust from that. (I'm hooked on the oil from Team Losi that's color-coded according to viscosity, so I use it in the Cat.)

The front wheels are attached to the wishbones with somewhat complicated hub-carrier assemblies. A single bearing (instead of the usual two) is pressed into a plastic inner hub that serves as the axle. With this single-bearing design, the front wheels have a lot of end-play that can't be adjusted out by tightening the wheel's mounting screw. I predict that this end-play will just worsen during repeated forays at the local track.

The front suspension was by far the most difficult thing to assemble. Some of the diagrams are a little misleading (particularly those showing the steering-level assembly), so watch your step here. Very little of this front end resembles anything

else I've built, and I've heard that some of the design was gleaned from Schumacher's proven 4WD Cat—particularly the rubber O-rings, or "tension bands," as they're called. These bands are a real pain to install!

Working in very limited space, the rings (two on each side) must be pulled over lugs on the front skid plate, passed under and around the bottom A-arm pivot, then pulled through a very small opening in the A-arm bracket and back onto the lugs. The O-rings provide securing points for the front of the arms, and the rear points are held in place by pivoting "crash-back" pins. By allowing the arms to flex rearward then spring back into place, this configuration helps the front arms survive collisions with solid objects. The instructions suggest that you use a piece of string to pull on the O-rings, but I didn't have any string stout enough to handle the tension needed. Try to avoid using metal objects like screwdrivers, as you could damage the O-rings. Both front A-arm assemblies, the steering-lever assembly and the front bumper must be held in place while the top plate is put into position and then bolted down with five screws. An extra set of fingers would be helpful here!

The front shocks mount to the suspension by a lever at the front and small hook-like mounts at the rear. In my kit, one of these hooks was missing, so the left shock was mounted with a 4-40 screw installed up through the bottom of the pan, then bent back to the proper angle.

The steering servo mounts on the chassis at a 70-degree angle and actuates the steering lever by way of two adjustable

(Continued on page 108)

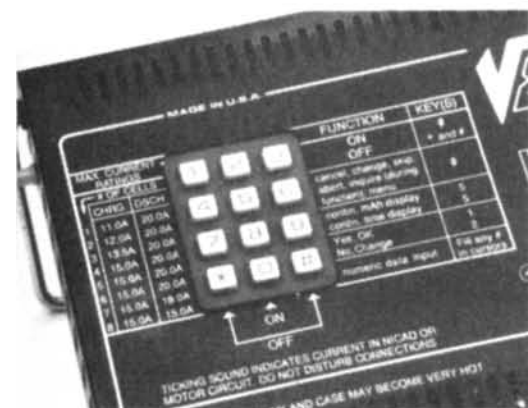
VICTOR ENGINEERING

HI-IQ CHARGER

COMPUTER-AGE CHARGING

by BOB PETERS

The HI-IQ combines the functions of a battery charger, discharger, cell matcher and more into one convenient package.



All the functions of the HI-IQ are controlled by the numeric key pad, and everything you need to know is written on the face of the unit.

ALTHOUGH I'VE WRITTEN about cars and racing for years, I'm having a tough time writing this article. I find it hard to write about a tool, even when it's one of the most important ones for competition racers. Rather than a highly technical analysis of this machine, this article will be a user's review: an honest appraisal of the battery-processing technology that's being brought into the pit by racers who can afford the price.

Do you need a \$350 battery charger?

For many, the answer is "no," but for that expanding group of racers who take this hobby as seriously as professional stock-car racers, the answer is "yes"—and they'll want more than one. After only eight weeks of testing, I'm ready for a second unit so I can have two going simultaneously.

The Victor Engineering* HI-IQ is a fully computerized Maximum Power Gain Conditioner/Analyzer. Now, I know that's not what you'll tell people at the track when they ask what it is. You'll say it's a battery-charging and discharging system that does a whole lot more. Then you'll start bragging about its capabilities. What you should really tell them is how it can improve the car's performance through precise charging, power-train analysis and battery-pack grading and conditioning.

First, the HI-IQ is a battery charger, but it takes more than just hitting the charge button after the pack has been plugged in.

The HI-IQ has a computer chip that reads a permanently stored program memory. The memory chip, called an EPROM (short for Erasable Programmable Read-Only Memory), has the HI-IQ's program stored in it. The EPROM is a plug-in module that the owner can change as he buys options for the unit. Despite its high-tech appearance, the unit is very easy to use. My unit didn't come with instructions, but I found it very user-friendly.

Here's an example of a charge cycle: select "charge" from the menu; select type of charge (timed or peaked); select type of battery (C or D cell, or other); select number of cells (default is 6, but you can go from 1 to 8); select the rate of charge in amps (unit defaults to 4.8 amps, but is capable of charging from 0 to 15 amps in .1-amp increments); and then HI-IQ clicks on and starts charging. A ticking noise lets you know it's doing its thing, and the display constantly reads out charge time, milliamps going in, amp rate and voltage.

No matter how much HI-IQ heats up, the built-in current reference keeps the charge rate within .02 amps of what you programmed. The charge rate is self-testing and re-calibrates itself 10 times a sec-

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ond, so there's virtually no drift. The HI-IQ tells you if you unhook the battery, main power or Ni-Cd, and it allows you to make corrections. It can sustain its functions on the Ni-Cd pack alone. When the battery peaks, the unit beeps and shifts to trickle and lets you repeat when you want. At the end of the charge cycle, the display reads out the time it took to charge, the peak voltage, the amps put in and the current voltage at steady state. This sounds like quite a process, but it goes quickly once you've done it a few times.

Although the HI-IQ shouldn't be thrashed around at a dirt track, it's more than just a bench unit. This is a compact assembly of many charging and discharging tools that the serious racer carries into the field. It charges and checks my packs after a run and tells me how much power is left in the battery so I can adjust gearing and motors. This professional, easy-to-use unit gives a precise charge and improves the batteries' performance.

On the peak-charge mode, a pack with a bad cell won't charge, because the peak sensor will shut it off. Also, a pack that's been drained with a resistor might not register any voltage; it might have to be boosted on the time-charge mode, or the unit will think there's no battery attached, because it can't read a voltage. For bad packs, use the time-charge method.

As an option for the HI-IQ, Victor will soon offer a cell-revival mode that may shock a cell back to life or recover lost capacity in older cells that have started to sag. The ability to update the HI-IQ gives it lasting value. But let's get back to what it can do *now*!

The second most-used function is the battery cell- or pack-rating capability. This function consists of one discharge/cool-off/charge/discharge cycle. Programming for the discharge cycle is very similar to that of the charge cycle. For a pack-rating cycle, program HI-IQ to first discharge the cell or pack to clean it off, wait for cool-off, then peak charge and finally discharge. HI-IQ does it all automatically after you set it. The results are continuously displayed until you reset the machine. You can program the rate of discharge in .1-amp increments up to 20 amps; allow cool-off from 1 minute to 9 hours, 59 minutes; set the charge rate up to 15 amps in .1-



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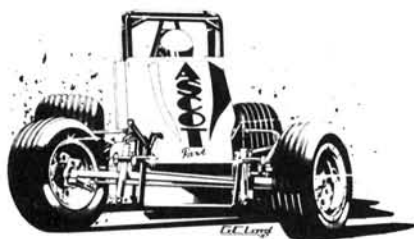
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HI-IQ CHARGER



The HI-IQ uses an LCD display, and it has input and output jacks to connect to power supplies and batteries.

amp increments; and set the discharge threshold in .01V increments.

With this incredible flexibility, you can test at length how charging affects discharge rate and results. The result of the grading cycle tells you the capacity in milliamp hours produced by the pack, the time it took to discharge and the voltage at discharge. There's also a neat little feature in the grading cycle: At the beginning of final discharge, HI-IQ discharges at 30 amps for 5 seconds. At the end of the discharge, it tells you what the punch voltage was at 30 amps, allowing comparison of packs for punch voltage.

For those of you who want to cycle and match batteries, HI-IQ will automatically cycle cells up to 99 times, according to your programming. Set it and come back later for cycled cells that are ready to go.

External use of the built-in digital voltmeter is also handy. Select the DVM function, plug leads into the meter input jacks, and HI-IQ can measure DC voltage up to 20 volts in .001V increments.

My unit has the optional motor-test feature that tells me the amp draw of my motor or drive train. Hook it up to the motor installed in the car, and it gives the draw as it turns the transmission and wheels. By altering gear mesh, bearings, etc., you can see the effect on motor load and efficiency. This feature, as well as the DVM, can be used without a main power supply; just power it with a 6-cell Ni-Cd hooked up to the Ni-Cd jacks.

Although there are still more features in the unit, the future options may be the most exciting yet. A partial list includes:

- interfacing to a personal computer for battery and motor analysis
- dynamometer providing rpm and electromechanical torque measurement
- lightweight, 16-amp AC/DC switching power supply

- speed-control testing
- motor break-in cycling
- auto-count lap counting and race management
- thermal battery peak charging
- automatic peak holding
- dead-cell revival
- stopwatch
- thermometer

Performance? I'm getting the best performance from my batteries that I've ever had. I know exactly where my packs rate, and I've fine-tuned my charging. I've been charging scores of packs and testing them, and some of my 1700mAh race packs test well. Using a charge rate of 3.8 amps to peak and a discharge rate of 10 amps to .9 volts per cell, pack A produced 2096mA in 753 seconds. Tested again two weeks later, I got 2105mA in 757 seconds. Pack B, charged and discharged the same way, gave 1985mA in 713 seconds the first time and 2035mA in 731 seconds the second time. The SCRs that I've tested have been about 1400mA in 505 seconds. The SCRs only vary by about 10mA from test to test, while the 1700s vary by about 30mA; really excellent repeatability for these types of cells.

I've also used another brand of discharger to verify my results. Other dischargers drop off in discharge current as they heat up, so you must monitor the rate. By correcting for that drift, I've found the results are quite uniform between the units.

Try changing the charge rate to see what happens. Pack A was charged at 5.5 amps and discharged as before. The output dropped from 2105mA/682 seconds to 1892mA/682 seconds. Pack B went from 2035mA/731 seconds to 1858mA/668 seconds.

It's time to break out the checkbook and go for it. The HI-IQ will revitalize your racing and battery performance. If you've been saving up for a good charger and discharger, now's the time. Production is limited, however, so they may be difficult to find.

**Here's the address of the manufacturer featured in this article:*
Victor Engineering, 380 Camino de Estrella,
Suite 170, San Clemente, CA 92672. ■

POLE POSITION

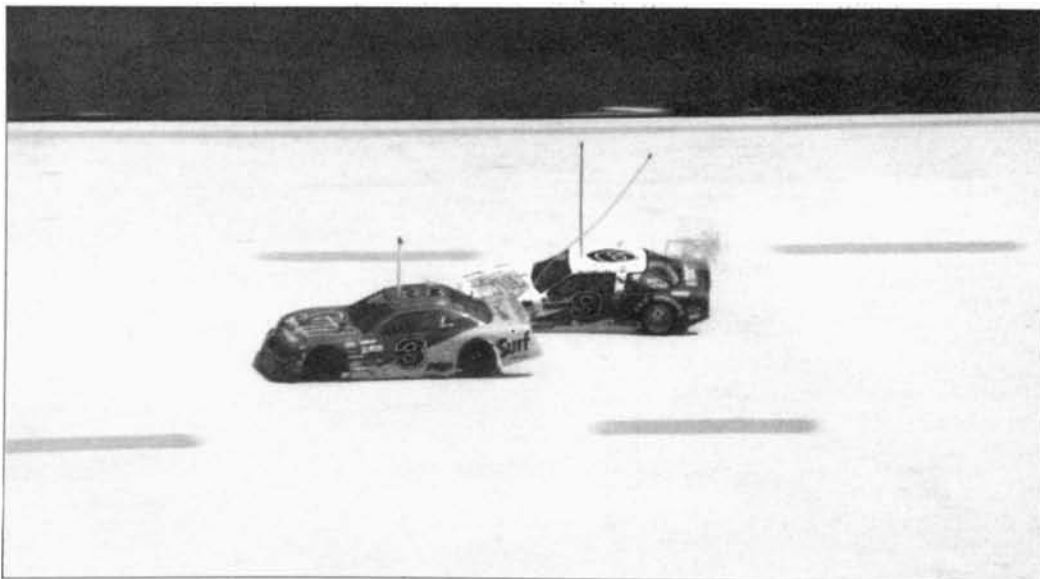
by RICH HEMSTREET

TRIPLE CROWN ON CARPET

WILL THERE BE A $\frac{1}{12}$ -SCALE Triple Crown this winter? Initial indications look promising, as John Thawley has picked up on an idea I mentioned while covering the '88 Winter Nationals in Grand Rapids, MI. In '88, the ROAR $\frac{1}{12}$ -Scale Nationals were held in Detroit, MI, by SEMROCC, Thawley's home club. I suggested that the '88 Winter Nationals, '88 ROAR $\frac{1}{12}$ -Scale Nats and '88 Cleveland U.S. Indoor Championships make up a $\frac{1}{12}$ -Scale Triple Crown. If things go as planned, on the weekend following Thanksgiving Day, there will be a 1989/90 $\frac{1}{12}$ -Scale Triple Crown kicking off in Cleveland at the U.S. Indoor Champs. The Grand Rapids Rivertown Racers will hold its 3rd Annual Winter Festival of Racing (formerly the Winter Nationals) in late January as the second jewel of the series. In the spring, SEMROCC will then hold the final race of the $\frac{1}{12}$ -Scale Triple Crown in Detroit.

All three races would be indoor events held on carpeted tracks, which seems to be the direction that $\frac{1}{12}$ -scale is taking. As the $\frac{1}{10}$ -scale on-road contingent continues to dominate the outdoor racing facilities, the smaller $\frac{1}{12}$ -scale cars end up running indoors on tight tracks where the larger cars frequently can't get around. But $\frac{1}{12}$ -scale carpet racing is an excellent test of drivers' skills. Even the 4-cell $\frac{1}{12}$ -scale cars are fast enough to require extremely quick reflexes. Drivers who can handle the speed of $\frac{1}{12}$ -scale cars on carpet and who have the concentration required to race for 8 full minutes, can usually adapt to other scales or classes of cars. In fact, $\frac{1}{10}$ -scale off-road racing almost feels like slow motion after running $\frac{1}{12}$ -scale carpet rockets all winter.

CompositeCraft and Hyperdrive are developing new $\frac{1}{12}$ -scale race cars. BoLINK is in the process of redesigning



Racing continues on the superspeedways as drivers earn points in the Pole Position National Championship.

its $\frac{1}{12}$ -scale Eliminator and will also produce some new $\frac{1}{12}$ -scale bodies. Those claiming that $\frac{1}{12}$ -scale racing was on the way out were obviously wrong.

Eventually, the $\frac{1}{12}$ -Scale Triple Crown could even replace the $\frac{1}{12}$ -Scale ROAR Nationals in importance. With a well-thought-out point system in place, the Triple Crown would be a really exciting series for kicking off R/C racing in the 1990s.

Pole Position Championship Update

The second round of the '89 Pole Position National Championship (PPNC) took place in Snellville, GA. Only two classes of the PPNC actually raced in Snellville at the ROAR Oval Nationals. Since ROAR hasn't developed an Invitational/Pro Class for the factory drivers, almost every sponsored driver raced in the $\frac{1}{10}$ -Scale Modified ranks with the amateurs. Since ROAR didn't allow dual entries, the $\frac{1}{10}$ -Scale Stock Class was spared most Invitational/Pro entries.

For PPNC purposes, the Invitational/Pro drivers were pulled out of the Modified results and each of the three classes earned points separately. The intent was to name an Invitational/Pro $\frac{1}{10}$ -Scale Oval

national champion and separate Amateur Modified and Amateur Stock champions. Therefore, once drivers enter an Invitational/Pro Class at one of the four events, they can no longer earn points in an Amateur Class. It's possible that some factory drivers, whom I didn't recognize, raced in the Nationals and earned amateur points, but I think that will show up as the championship carries through the *Car Action* East-West Oval Shootout being held at the Thunderdrome and Lake Whippoorwill International Speedway.

Since Cliff Lett passed up Snellville, he dropped from the lead in the PPNC Invitational Class standings. Kent Clausen took over the lead with a 391-point total, with Chris Doseck only 6 points behind in 2nd. Joel Johnson is in 3rd place with 379 points, but he'll probably be in Australia during the next race in the series, and this will drop him way down. ROAR Oval National Champion Terry Rott is one point behind Johnson, followed by Tony Neisinger and Bob Hall, each with 376 points.

The Amateur Modified standings are still unofficial, as a few drivers' names are being double-checked. In 1st place is Bill

(Continued on page 38)

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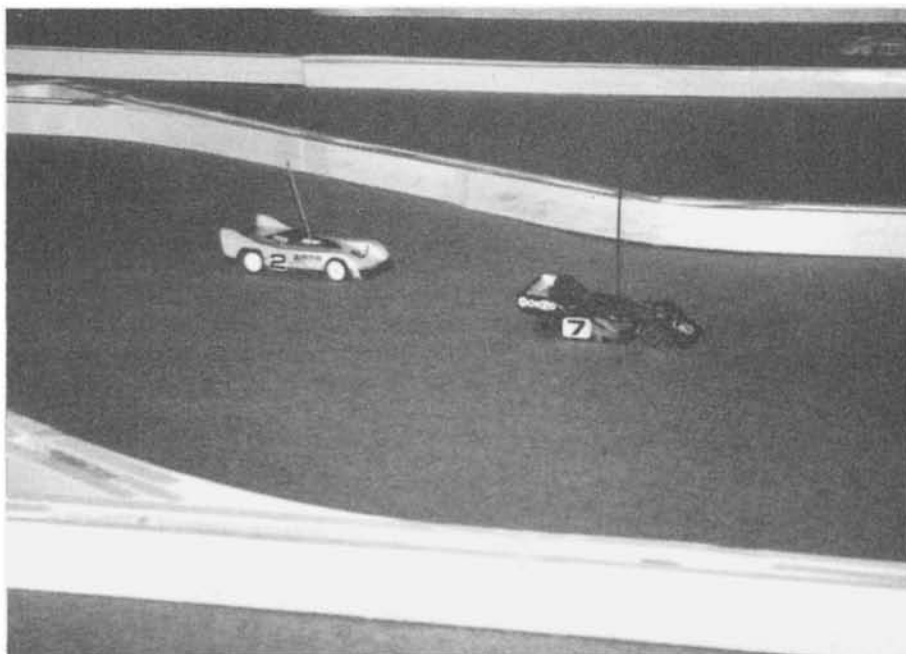
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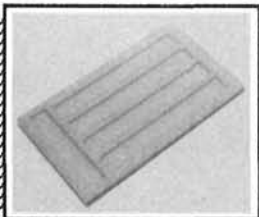
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POLE POSITION



Hopefully, a 1/12-scale Triple Crown will take place on carpet this winter, starting in Cleveland.



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Schoenau with a 371-point total. One point behind appears to be Joseph Randow, but this one is still in dispute. Cliff Guest is tentatively in 3rd place, just three points out of 1st, and only two points behind Guest is Mike Mitzel with 366 points.

There's no dispute in the Amateur Stock PPNC standings, as Kevin Lanier has a perfect record after two races. Lanier has two TQs, and he won both A-Mains. With 402 points total, Lanier has a 14-point lead over Ricky Jordan. In 3rd place, Jill Simms has a 375-point total, while Matt Cupka trails her by 4 points in 4th place. Kevin Vermillion rounds out the top five, but he finds himself already 42 points out of 1st.

The PPNC's Chassis Manufacturer Championship (CMC) also continued in Snellville. Only the Modified and Stock A-Main results were figured in. CompositeCraft and BoLINK each scored 16 points as they maintained their hold on 1st and 2nd respectively. Other than changing the points separation, most of the other standings were unchanged. The only exceptions were that Advanced Racing Technologies (manufacturers of the Lucas Agitator) PRC (manufacturers of the PR-7) and MRP, (manufacturers of the new GP10) each scored their first points in the CMC.

Here are the standings for the CMC:

1. CompositeCraft	41
2. BoLINK	35
3. TRC	25
4. Associated	19
5. Vicfor	5
6. Advanced Racing	4
7. PRC	3
8. McAllister	2
8. MRP	2

Finally, the East-West Shootout is closing in on us. At these events, the Invitational/Pro Class drivers will be racing in either 4-minute racing or superspeedway racing, or both. Superspeedway racing is the name that's been placed on events that require (and permit) battery changes and pit stops. The old enduro terminology just doesn't fit the style of racing that takes place on 1/10-scale paved oval tracks. While tactics do play a role in these longer races, the racing is wide open and flat-out. The Car Action East-West Shootout will have a separate two-race point series going for the pro drivers who compete in the superspeedway events. The top driver in the superspeedway points series will be named the 1989 NARA Pro National Champion.

That's all for this month. Remember, practice is the key to going faster. ■

R A C O INDY CAR P R E V I E W



by STEVE POND



FEEL THE NEED FOR SPEED

INDY CARS ARE the latest rage in 1/4-scale racing, and RACO* is developing a hot Indy car that promises to be a front-runner as the class becomes more popular.

On an Indy car, the chassis and body sit almost entirely below the top of the tires, and the resulting low CG gives 1/4-scale racers better handling, less drag and faster speeds than ever before.

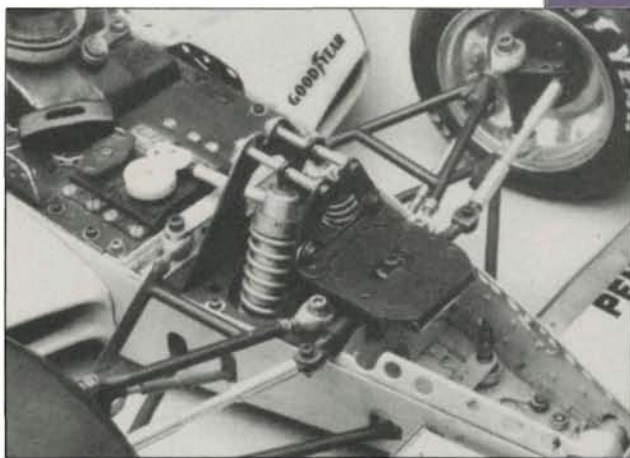
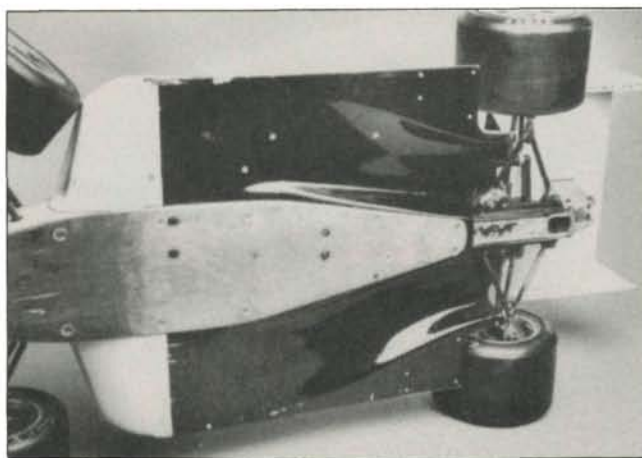
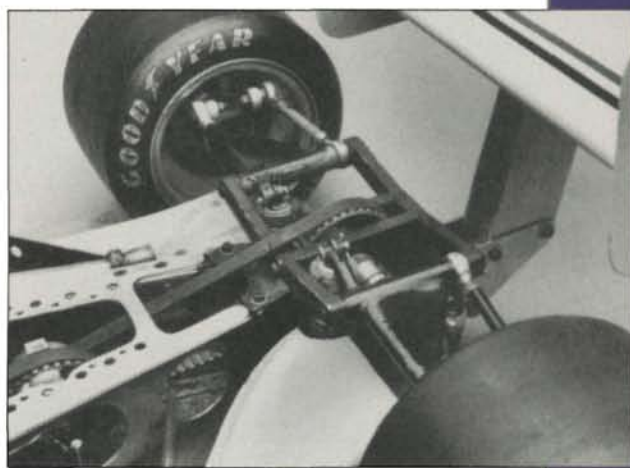
I first saw the RACO prototype Indy car during the 1988 King 8 Supernationals in Las Vegas, NV, and its design made me wonder just where they'd stuffed that 23cc engine. In fact, it's mounted transversely, with the cylinder head facing forward toward the driver's area, and this gives the body a scale appearance and a lower CG.

On the production version, the drive system will be changed to a shaft-driven ring-and-pinion setup that should retain the independent rear suspension. Other innovations include inboard front and rear shocks that dampen the 4W independent A-arm suspension. The RACO chassis plate resembles those of the full-scale Indy cars in that it's designed to keep the car hugging the ground at high speeds.

Since the production version will differ slightly from the prototype, I thought it might be tough to retain those sharp lines,



Left: Just like the other cars in the RACO line, the Indy car will feature the 23cc Zenoah engine shown here. Below: The independent rear suspension uses inboard shocks. The belt-drive system shown here will most likely be replaced by the RACO quick-change rear. Bottom left: The underside of the prototype reveals some incredible ground-effects work that should keep the car hugging the ground at higher speeds. Bottom right: The front suspension on the RACO Indy prototype is pure Indy style, with independent A-arms and inboard shocks.



but John Rahe of RACO tells me that the car will closely resemble the prototype in everything but the drive system, and it will be available in October.

If the prototype I saw at the King 8 race shows the performance that we can expect from this new car, it will undoubtedly be fast on the track. The minimum weight limit established by QSAC for Indy cars will be 25 pounds, whereas it's 19.5 pounds for sprint cars. Because of this, on shorter tracks with tight turns, the

speeds we see might not be as high as those of the sprinters, but get one of these Indy cars on a *large* track, and there's no telling *what* it will do.

So Indy fans who have been waiting patiently for a RACO 1/4-scale version of their favorite Indy car should start getting excited! It's on its way!

**Here's the address of the company featured in this preview:*
RACO Model Craft, 1400 E. St. Andrews Place, Santa Ana, CA 92705. ■

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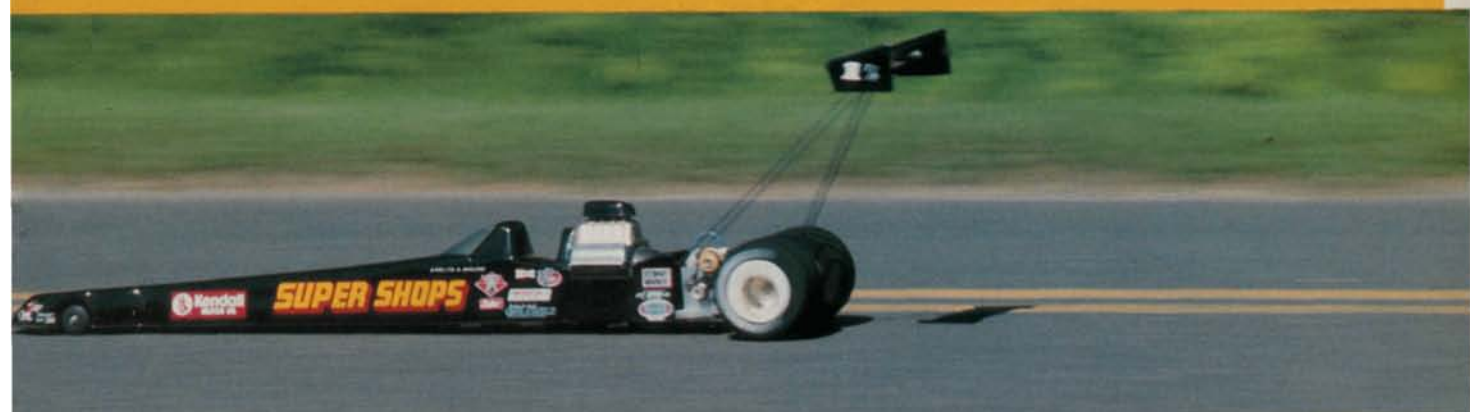
1 / 10 TOP FUELER DUELER



PHOTO BY STEVE POWIE

by ERIC GOLDSCHRAFE

AS YOU EASE the sleek top-fuel dragster into the staging beams, the tension mounts. You wonder if your tires are hot enough on the burnout, and if all the mechanical parts are ready for your assault on the 1/4-mile. There's a car in the other lane, but you don't even notice it as the lights come on. Your concentration must be intense—the yellow



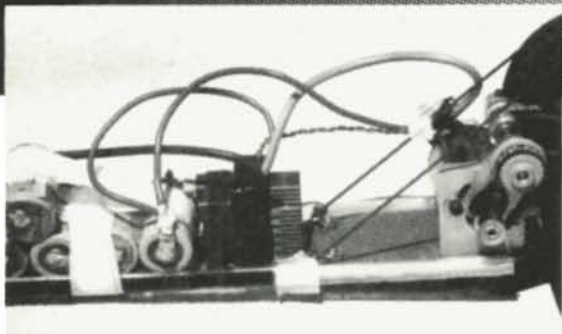
ping the firesuit, you unzip the *car*, by simply sliding your finger along the lower body where it meets the Lexan chassis. The Velcro strips undo and the body comes off all in one piece. Zip it back together, and this wheeled rocket takes on a familiar shape—the awesome “Swamp Rat XXX” built and raced by Don Garlits.

Although Craig Models* doesn't mention it, their car is a very good replica of the famous “Swamp Rat XXX,” and I couldn't pass up the opportunity to finish it this way. You don't have to paint yours black to make it go fast; just about any color scheme works fine. A considerable amount of thought and design has gone into this kit, and there's no reason why you can't build yours into a potential record-holder.

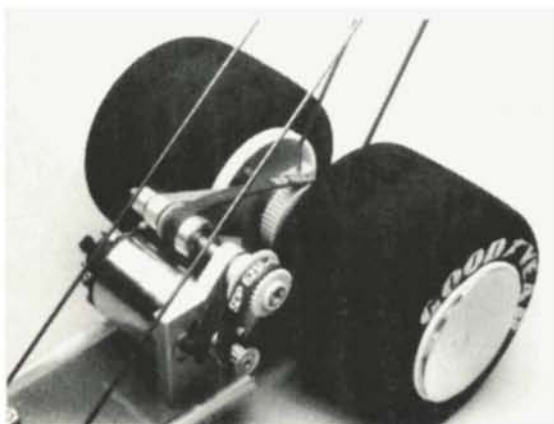
The entire chassis and body, along with a few other parts, are molded in strong, clear polycarbonate plastic, and when assembled, they form a fairly rigid, yet light structure. The instructions guide you along as you carefully trim out the parts with a hobby knife and a motor tool. Several photographs detail just how to cut and where, so most modelers should have no trouble figuring it out. But you must be careful not to cut off too much or cut the wrong way, as repairs are difficult. Read through the instructions carefully; then proceed, step by step.

The sub-frame for the front steering comes already trimmed, and serves as a template of sorts as you make the first cuts into the chassis. The plans call for Tamiya* Hornet-type front spindles and ball bearings, but other parts will work as well. I tried a couple different sets of front steering components for fit and function, particularly with the Perfect front tires. To get the look and functional advantages of small-diameter front wheels, Craig has done exactly what Garlits did—he utilizes airplane parts! The tires are Perfect's 1 1/8-inch-diameter rubber wheels with the hubs removed. You'll quickly see that the ball bearings fit right into the recess in the tire where the hub was. In addition to being small, these tires have a narrow tread profile that will really help with the usual overcontrolling problems at high speeds.

blinks, the green comes on, and you're gone! In less than 3 seconds, the race is over, and now you have to concentrate on getting the car stopped before you run out of shutdown room. About this time, most dragster pilots are unzipping their firesuits and wondering how many pistons they've burned. But all *you* have to do is give the battery a quick charge, and you're ready for the next round. Instead of unzip-



The new Tekin mini receiver, standing upright against the Tekin ESC 600 speed controller, fits conveniently on the narrow rail chassis.



Filing flat spots for all the pulley setscrews is definitely a good way to guard against slippage.

My final installation used Advance* spindles and bearings, which fit perfectly. The ball links were connected with a small piece of threaded rod to tie the steering together.

The sub-frame is molded to fit a KO* mini servo, but I used a Futaba* S135 servo located farther back in the chassis. The photos show how a standard star-shaped servo horn nestles between the ball links, and when moved by the piano wire running to the servo, it provides the desired steering effect. Other setups will work just as well, but make sure that it operates smoothly and al-

lows only enough steering to keep the car straight. Too much steering will definitely cause trouble on the top end of the 1/4-scale, where speeds in the 60mph region are attainable.

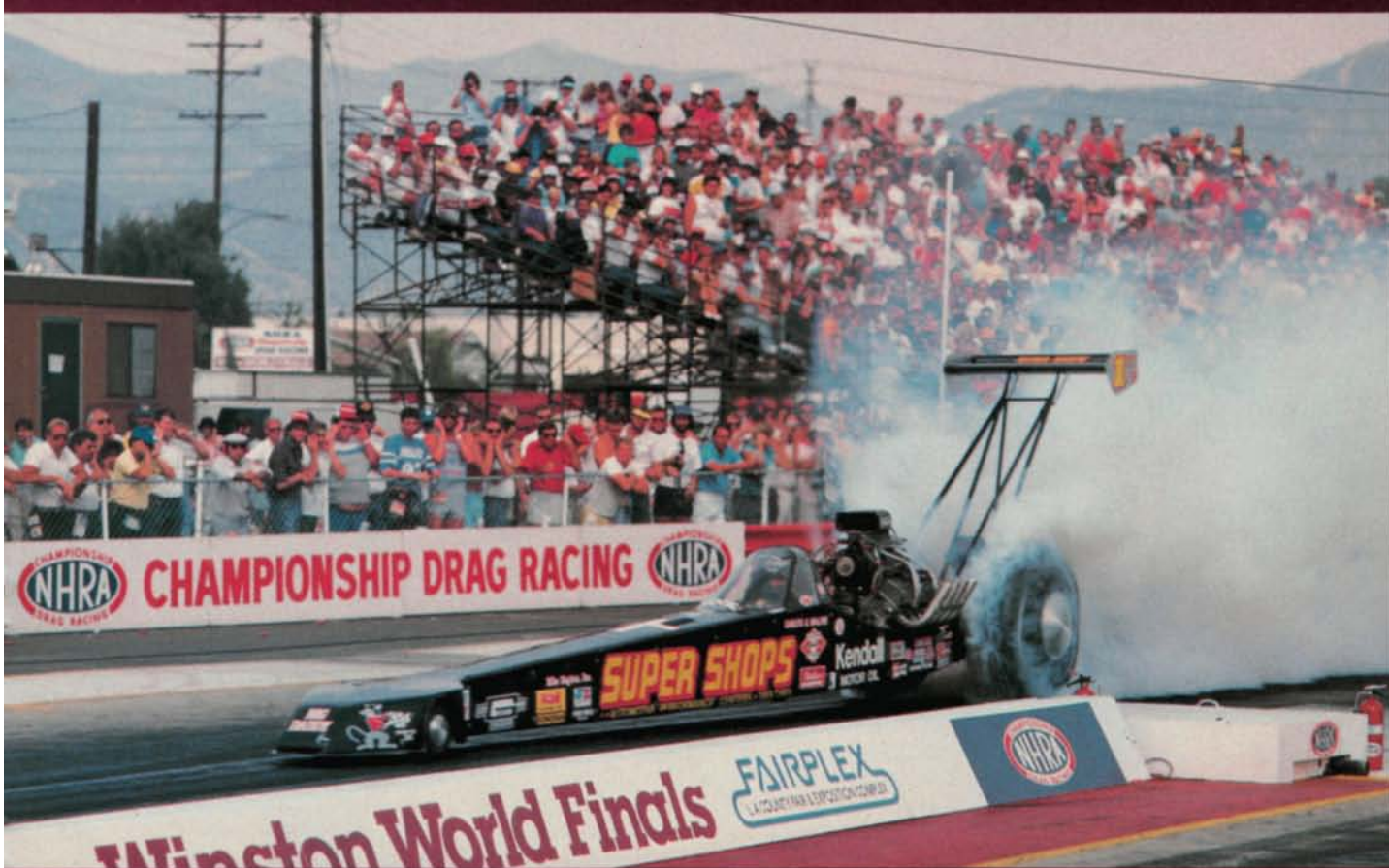
Also left up to the builder is the rear-end setup. Several references are given, and, basically, any narrow-track rear-end setup will work and is adaptable. A spur-gear pod works fine for a high-torque motor, such as the Astro* Turbo. The Advance belt-drive assembly from their dragster works well with modified motors that pull a lot of revs. This is the unit I chose, and I powered it with a Black Magic* motor. Make sure you have the setscrews for the pulleys tightened in place on the shafts; otherwise, the pulleys will spin. (I think it's worth the effort to file flat spots on the shafts to tighten the setscrews against, especially if you're using radical battery and motor combos.) A small piece of fiberglass board was fashioned into a mount for the Advance parts, and this was bolted to the rear of the chassis.

A Tekin* ESC 600 speed control was servo-taped to the chassis to handle the throttling of up to 10 cells, although seven cells were used for the test runs. All the room in the chassis quickly disappears as you load in the radio gear and batteries, so make sure nothing hangs out over the edge or sticks up so high that the body

KID DAD BIG

won't fit on.

Next, the slender body was trimmed out. Much care must be exercised when cutting the engine-block section. The body is molded so that the engine area is cut out, rotated 180 degrees, and re-installed, giving the correct shape in the cylinder-head area. It's a neat



MENTION DRAG RACING, and the person who first comes to mind is probably Don Garlits. This isn't just because he's well-known, but it's also because he's been around for decades, both as a champion racer and as an innovator. His famous Swamp Rat top-fuel rail dragsters have set more speed records and elapsed-time records, and pioneered more innovations than I have room to mention here.

In 1970, at Lions Dragstrip in Long Beach, CA, Garlits was driving a front-engine dragster (the standard of the time) when the engine exploded, ripping the car in half, and taking with it part of his foot. This tragic incident inspired Garlits to create the first com-

petitive rear-engine dragster, and he also designed and built the first successful streamliner body.

Known by drag fans as "Big Daddy," he is, without question, the king of the sport and, with so many accomplishments to his credit, a veritable legend. With great foresight, Don has preserved many of his cars and other landmark drag cars and memorabilia at his museum in Florida. Indeed, the significance of his successes and innovations has received such national recognition that the Smithsonian Institute requested his Swamp Rat XXX for permanent display in a special section of its museum that highlights materials development!

idea, but the parts don't fit back in very well, so you've got to be careful. The injector "bugcatcher" scoop is made from part of the plastic you've trimmed away, and, after a little creative painting, the engine looks pretty good. There are no provisions for the "zoomie" header stacks, and

there's no easy way to make them and keep the weight down (at least I haven't come across one), so I leave them off (a pity).

The body was painted with Pactra* black and then decorated with the appropriate decals. The large lettering was done with Top Flite*

MonoKote trim sheets, as were the little rat emblems up front. The rest of the lettering is Autographics* and Coverite* decals.

Using the photos of the real car as a guide, the scale-like wing was mounted to the chassis with two piano-wire brackets bent into shape. Velcro

(Continued on page 47)

CRAIG MODEL CO.

TOP FUEL DRAGSTER

Type Rail dragster
Scale 1/10
Sug. Retail Price \$79

DIMENSIONS:

Overall Length 31 inches
Width 6.5 inches (7.125 inches wing)
Height 4.5 inches (11 inches over wing)
Wheelbase 26 inches
Front Track 2.625 inches
Rear Track 4.125 inches

WEIGHT:

Gross (w/bat) 46 ounces

BODY:

Type Streamlined top-fuel rail
Material Polycarbonate

CHASSIS:

Type Flat w/molded ribbing
Material Polycarbonate

DRIVE TRAIN:

Type (pri./sec.) Belt/belt (not incl.)
Differential None
Bearings/bushings Ball bearings
(not incl.)

SUSPENSION:

Type (f/r) None
Dampening (f/r) None

WHEELS:

Front: Type One-piece wheel/tire
(not incl.)
Dimensions (DxW) 1.125x.1875
inches
Rear: Type Nylon (not incl.)
Dimensions (DxW) 2x2.5 inches

TIRES:

Front One-piece wheel/tire (not incl.)
Rear Foam slick (not incl.)

ELECTRICS:

Motor Black Magic (not incl.)
Battery required 7 to 20 sub-Cs or
3/4 sub-Cs
Speed controller Tekin ESC 600

OPTIONS AS TESTED:

Advance front-end parts, rear jack-shaft belt-drive unit, ball bearings, rear wheels and foam slicks; Perfect one-piece rubber aircraft wheel/tire; Black Magic motor; Futaba transmitter and S135S servo; Tekin speed control and receiver.

COMMENTS:

Not the easiest car to get started on, but once begun, goes together quickly. Looks sharp! Tracks as straight as an arrow and isn't touchy when steering is dialed out.

strips were cut to widths of $\frac{3}{16}$ inch and installed along the straight edges of the chassis and the inner lower-body panels. Once the body is fixed to the chassis, almost all the flexing is eliminated (sort of a monocoque effect). Now, if you've got enough nerve, this baby's ready to run!

Craig claims that this car will do the $\frac{1}{4}$ -mile in 3 seconds or less, and, with the proper combination, there's no reason why it couldn't do it in the low 2s. The way motor and battery technology keep improving, any projected elapsed time is subject to improvement.

When tested, the car was quite easy to operate, as long as it was run on a smooth surface. It tracked as straight as an arrow and wasn't at all touchy when direction corrections were made. One hint, though: Since most of the steering has been dialed-out for the run, it must be dialed back in, once you've slowed the dragster down, before you try to turn the rail around. The long wheelbase gives the car a wide turning radius, and if you don't have enough steering, you won't make it. I used Advance's new super-soft foam slicks and got plenty of "bite" for this rat.

It's a safe bet you'll see more of these cars at drag meets as time goes on (and the competition catches on), but in the meantime, anybody wanna race?

**Here are the addresses of the companies mentioned in this article:*

Craig Model Co., 19515FM 149, Box 142, Houston, TX 77070.

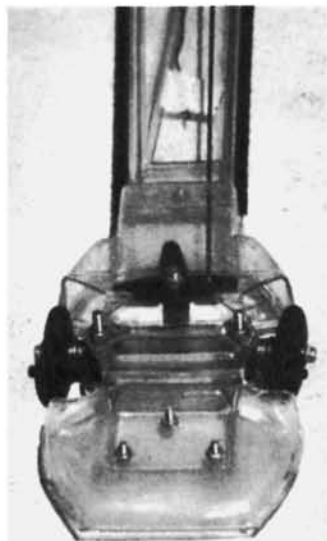
MRC/Tamiya, 200 Carter Dr., P.O. 267, Edison, NJ 08818.

Advance Engineering & Mfg. Co., P.O. Box 766, Woodland Park, CO 80866.

KO Propo; distributed by Global Hobby Distributors,

SR-1 RAIL

(Continued from page 45)



The front tires are Perfect airplane tail wheels riding on Tamiya spindles.

10725 Ellis Ave., Fountain Valley, CA 92728.

Futaba Corporation of America, 4 Studebaker, Irvine, CA 92718.

Astro Flight, Inc., 13311 Beach Ave., Marina Del Ray, CA 90292.

Black Magic, 604 South Grand Ave., Fowlerville, MI 48836.

Tekin Electronics, 970 Calle Negocio, San Clemente, CA 92672.

Pactra, 410 N. Michigan Ave., Rm. 1280, Chicago, IL 60611.

Top Flite Models, 2635 S. Wabash Ave., Chicago, IL 60616.

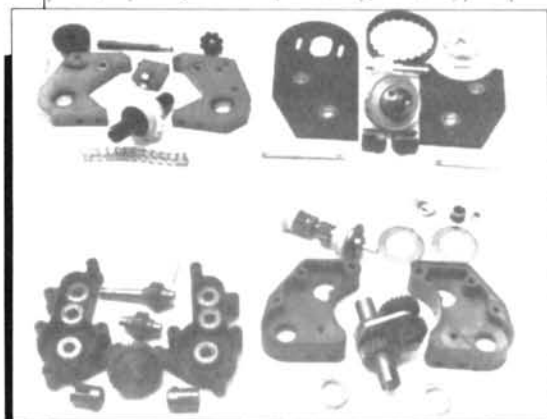
Autographics of California, 7401-1 White Lane, Bak-ersfield, CA 93309.

Coverite, 420 Babylon Rd., Horsham, PA 19044. ■

TRANSMISSION DECISION

by BOB GAGNE

Four options to smooth power



Disassembled transmissions. Top (left to right): Team Pit Stop and Track Master. Bottom: MIP and Associated with hop-up parts. Note the numerous large parts for the Associated transmission.



ALTHOUGH THE transmission is the most important part of any great race car, it's a part that's often overlooked by both novices and experts. Without a smooth, efficient transmission, the hottest of motors won't power your racer to its potential. The car that handles best won't be in the A-Main if it can't get powerfully into and out of turns.

The Associated* RC10 trans-

mission has been an industry standard for many years, and it's still the one by which others are judged. Much has been written about this tranny, and many after-market hop-up parts are available, but how competitive is it? By pitting the Associated transmission (with some of the hop-up parts installed) against after-market transmissions produced by MIP*, Team Pit Stop* and Track Master*, I hope to clear away those

- the cog drive (Team Pit Stop cog-and-chain and Track Master cog-and-belt).

Most car kits have a gear-drive transmission, which has proven to be very durable, but isn't always as efficient as it could be. The dominance of the geared transmission has recently been challenged by belted and chain-driven trannies that are touted to be more efficient than those with meshing gears.

clouds of confusion.

The Similarities

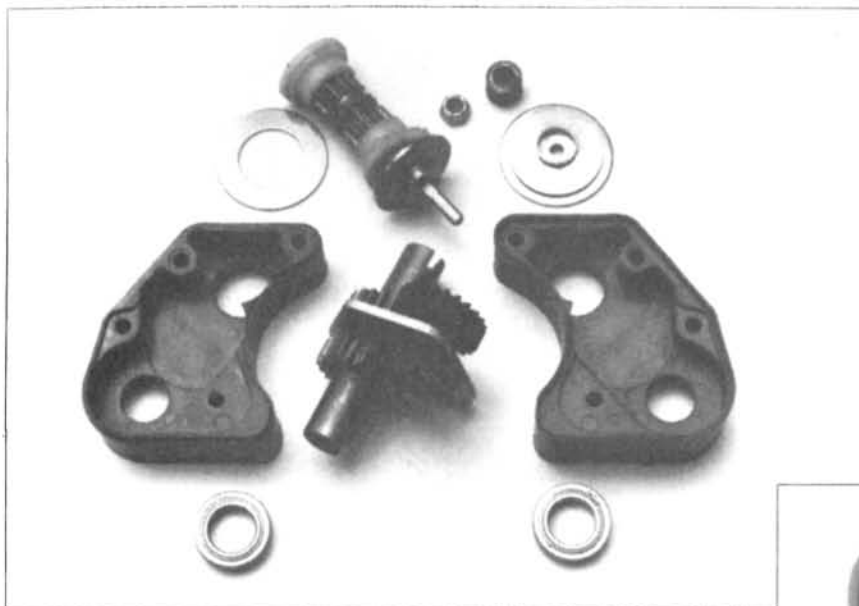
- All accept stock dogbone drive shafts.
- All use spur and pinion gears of any pitch.
- All employ a ball differential
- All can be mounted on any standard or after-market chassis that accepts stock Associated rear suspension parts.

The Differences

Transmissions can be classified according to drive types:

- the all-gear drive (stock Associated and MIP transmissions)

TRANSMISSION DECISION



Above: The Associated transmission disassembled shows numerous parts, which means friction that drains power, but the tranny proved to be competitive.

Right: The Associated RC10 transmission. The transmission case is molded in white nylon, which can be dyed to whatever color the builder desires. In this case, it was dyed royal blue. Note the output bearing.



ASSOCIATED STOCK

Drive Type	 Gear drive/Ball diff
Weight	 3.5 ounces (heaviest tested)
Instructions	 Very good photos and text
Assembly	 Most difficult of those tested
Drive Ratio	 1.85:1
Workmanship	 Generally good. Some hand-fitting
Materials	 Nylon/steel gear combination
Bearings	 12 bearings
Performance	 Very good
Cost	 \$95 with hop-up parts used
Maintenance	 Very easy to maintain
Other notes	 Reliable and consistent

● **ASSOCIATED'S GEARED TRANSMISSION** is by far the most difficult to assemble. Its complicated design and only fairly good parts finish require a lot of hand-fitting and extra care. Although the instructions are the best in the industry (well illustrated, with very good photographs of the many steps and assemblies along with the text), some tips should be included to help first-time builders through the tough parts, e.g., installing roll pins, fitting bearings to shafts, and what to do if the gears bind after they've been assembled on the spine plate.

The workmanship is generally good, but if you want a tranny that works smoothly, you must file off the burrs left on the edges of the steel gears by the cut-off tool. The after-market hop-up parts, which fit without modifying the original assemblies or the parts themselves, really make a big difference in this transmission.

Although Associated's choice of materials is very good (self-lubricating nylon, steel and aluminum), the Litespeed® Delrin idler gears and Team Losi® steel diff tube with support bearing produce a transmission that runs more smoothly. The Gold Seal output-drive support bearings help to prevent the slots in the output gears from wearing and prevent the output drive gears from binding under pressure.

The very numerous Associated parts not only make the transmission difficult to assemble, but also reduce its efficiency. This tranny has 12 bearings: one on each idler gear; two on each axle drive gear; one output bearing on each side (optional hop-up part);



Third-party hop-up parts that make a difference include Team Losi's ball-bearing diff tube, Litespeed's Delrin idler gears and Gold Seal's output bearings.

one on the main pinion shaft; one on the diff tube; and one support bearing inside the Team Losi diff tube. There's also a thrust bearing between the main pinion and the inside edge of the diff-tube assembly. This adds up to *lots* of friction points that can rob the car of power.

On the positive side, this is a very reliable transmission that requires very little maintenance. Because I installed an optional Litespeed Delrin self-lubricating gear, no oil or grease is needed. The gear case is well sealed against dirt and moisture. The diff is very easily adjusted by removing the gear dust cover and turning the adjustment nut. This is by far the most accessible diff adjustment I tested.

MIP

Drive Type Gear drive/Ball diff
Weight 2.75 ounces (very light)
Instructions ... Very good line drawings, but abbreviated text
Assembly Very easy, simple design
Drive Ratio 2:1
Workmanship Superb machining of No. 10 diff parts. No hand-fitting required
Materials Hardened-steel gears, plastic gear case
Bearings 6 high-quality ball bearings
Performance Excellent. Fastest single lap
Cost \$124.95
Maintenance "Every race week."
 Easy to disassemble
Other notes Easy to drive, difficult diff access



Above: Disassembled, the MIP's simplicity is evident. It's shown here with the assembled diff. The finished look of the gears indicates the superb workmanship, and the small size keeps the weight down and creates low rotating mass.

Left: The assembled MIP transmission is one of the smoothest and most durable transmissions tested. It also turned in the fastest individual lap time of the performance tests.

● **MIP'S TRANSMISSION** is also geared, but that's where the similarity ends. The instructions for the MIP tranny are line drawings, which are very good, but they aren't sufficiently detailed. They present the assembly of the "#10 DIFF" well, but the rest of the assembly instructions constitute a small "box" of written directions and an exploded view of the other transmission parts. Even so, the transmission was assembled very easily owing to the clarity of the illustrations and the transmission's simple design.

The workmanship was superb. The machining of the "#10 DIFF" parts was very clean, and tolerances were very tight. There were very few tool marks on the metal parts and no burrs on the gears. No hand-fitting was required, yet the completed transmission had no slop or excessive end-play, and it fit the RC10 like an original part.

The original gears were of perfectly machined brass, but the newer models come equipped with equally good hardened-steel gears. The steel gears might be slightly noisier than the brass ones, but they're stronger and much more durable. Delrin idler shaft and pinion gears are available as an option and will make the transmission quieter and smoother, but not nearly as rugged. The gear case is of a tough plastic that's like ABS. The kit comes with six high-quality ball bearings: two for each idler-gear shaft and pinion-gear shaft and two for the differential. There's also a set of bearings in the "#10 DIFF" itself.

This was the second-lightest transmission of the bunch (only

0.05 ounce heavier than the Team Pit Stop tranny), because the tranny has few parts, and they're very light and small, especially in diameter. The size of the gears makes for a low rotating mass. Since Team Losi decided to outfit the JR-X2 with gears, which are more difficult and more expensive to produce than cogs, belts and chains, they, like MIP and Associated, must think that gears are still the best way to go.

The instructions say that the diff should be taken apart and cleaned with kerosene "every race week." Owing to the transmission case's excellent dust seal, you might get away with longer periods between cleanings, but because the transmission is so simple to disassemble, you might not want to cheat on servicing.

The only thing I don't like is the diff adjustment: To adjust the diff, you have to drop the suspension control arm and remove the dogbone on the left side of the car with an Allen wrench through the output adapter.

There must be a reason why Bullet Racing and Allec & Lane Manufacturing* (A&L) both offer the MIP transmission as an option for their graphite chassis kits. After the performance tests, I installed it on an A&L chassis and used a Trinity* "Joel Johnson" motor for power. This setup is super hot, and it seems to be very reliable, because I haven't had any problems. Of the two geared transmissions tested, this is clearly the best. It lives up to its reputation as a very durable, reliable, efficient transmission.

TRANSMISSION DECISION



Above: Team Pit Stop holds very close tolerances on all parts, but some of the parts must be hand-fit. The shiny spot on the end of the upper sprocket shaft was the result of polishing with 400-grit sandpaper to fit it through the bearing. Also, two flat spots must be ground on the shaft to secure the sprocket grub screws.

Right: The assembled Team Pit Stop transmission is one of the simplest, but it's a very good performer. Note the chain-tensioning bearing. The side plates are of white nylon, but they've been dyed royal blue for this photo.



TEAM PIT STOP

Drive Type	 Cog and chain/Ball diff
Weight	 2.7 ounces (lightest tested)
Instructions	 Tiny print, poor illustrations
Assembly	 Relatively easy to assemble, some hand-fitting
Drive Ratio	 Variable: 1.87:1, 2.0:1, 2.14:1, 2.28:1
Workmanship	 Excellent workmanship
Materials	 Hardened steel, nylon and stainless steel
Bearings	 5 bearings
Performance	Explosive power and control in the turns-
Cost	 \$124.95
Maintenance	 Extremely easy to disassemble
Other notes	 Flats for grub screws on upper shaft should be machined at the factory

● **TEAM PIT STOP** has come up with one of the more innovative designs, and it uses a cog-and-chain-drive system. Because of the choice of materials (hardened steel, nylon and stainless steel), the case design, and the quantity and size of the parts, this was the lightest transmission tested.

The instructions were in *micro* print, which didn't help the assembly at all. To compound the problem, the instructions were very involved and detailed. There were few assembly illustrations: just exploded line drawings of the diff assembly and the transmission, labeled only with part numbers. A further frustration was that some of the drawings weren't accurate renditions of the actual parts. The instructions warn about the close tolerances of the parts and say that some hand-fitting is required. This warning should be heeded.

Team Pit Stop should be commended for its very useful gear chart, which saves you from doing the calculations to determine which spur/pinion gear should work for you. If you already have a ball-park idea about the ratio you'll need, the chart will help you decide on the right Team Pit Stop cog combination to install in the tranny. The company also supplies two sets of sprockets that make four drive ratios possible.

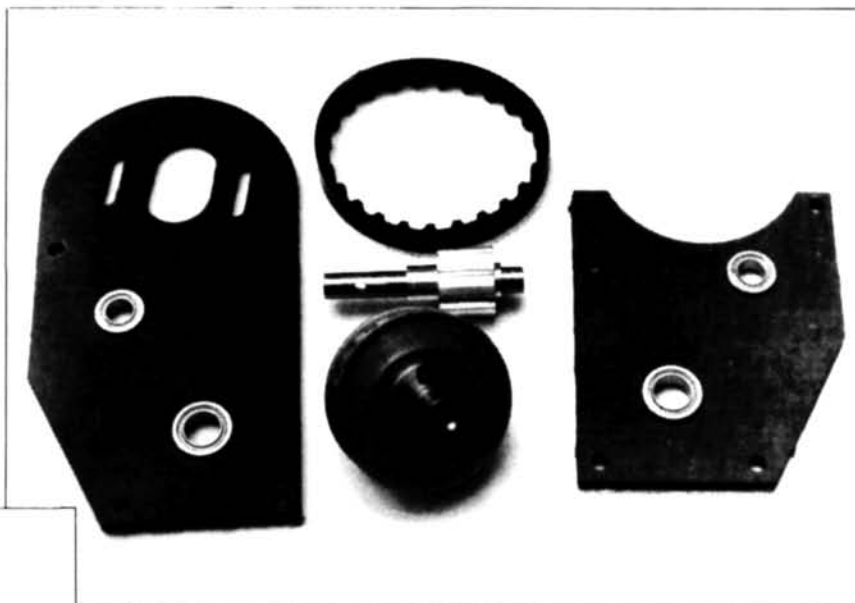
Even though the instructions had several flaws, the transmission was relatively easy to assemble. Once past the diff assembly, there are very few parts to be concerned with, because the

design is simple and very logical. The "upper shaft," i.e., the one on which the spur gear will be installed, had to be polished with 400-grit sandpaper and then hand-fit to the bearings. On the shaft, you must also grind two flat spots for the setscrews that secure the "upper sprocket" to it. Since this is a hardened-steel shaft, if you don't have a Dremel tool or a bench grinder, you're in trouble. There's no way you'll ever be able to file a flat on this shaft. I can't see why the manufacturer didn't machine two flat spots on the shaft before it was hardened.

No problems were encountered with the stock motor used in the performance tests. After the formal tests, this transmission was installed on the A&L chassis I use for modified dirt racing. With a Trinity Speedworks 350 motor for power, the car is explosive off the line and powers past other cars in turns, but the diff seemed to slip excessively on a sticky track when using a 7-cell battery pack. Readjusting it just a little (you do this through the right-side output adapter) seemed to lock it up solidly. The instructions warn that overtightening the diff adjusting screw might crack the adjustment bearing, but on disassembly, there was no evidence of damage. Upon reassembly, I adjusted the diff and, this time, it was perfect. Whatever the problem was, it had cured itself, and I've had no more problems.

TRACK MASTER

Drive Type Cog and belt/Ball diff
Weight 3.4 ounces
Instructions Excellent
Assembly Easiest to assemble
Drive Ratio 2:25.1
Workmanship Very good; machining excellent
Materials Graphite plates, hardened steel and aluminum
Bearings 4 bearings
Performance Very easy to drive
Cost \$139.95
Maintenance Very easy to maintain
Other notes Quietest of all the transmissions tested. Stiffest and most prone to binding when new.



Above: Disassembled, you can easily see why this tranny is the most innovative. Compared to the Associated, there are hardly any parts in this transmission.

Left: Track Master is the simplest of all with the fewest parts. Its aluminum mounts fit under the rear suspension blocks.

● **TRACK MASTER'S** transmission uses a cogged belt-drive system, and it was the most innovative and quietest of the ones tested. The choice of graphite for the case (for strength and weight reduction) is commendable.

You might find that the graphite doesn't dissipate the heat built up by the motor. While it's lighter than the aluminum version, when you add a heat sink to the motor (and you'll probably want to do this), the two versions weigh about the same. Keep this in mind if you're considering buying this tranny. Other materials include hardened steel in the diff assembly (to resist wear) and aluminum cogs and mounting hardware. As the Track Master is a very simple, well-designed unit, it's easy to assemble; in fact, it was easier to assemble than the three other transmissions tested. The workmanship was very good with excellent machining, so there's very little end play and no slop anywhere.

The instructions for the kit include very good photographs, clear explanations for each assembly step, and a gear chart with spur/pinion ratios for 32-, 48- and 64-pitch gears. For comparison, charts for three diff final-drive ratios are also included. They show gear ratios for a tranny with a 1.83:1 drive ratio (stock RC10); the Track Master drive ratio of 2.25:1; and the Team Pit Stop and the MIP drive ratios of 2.0:1. The Track Master seems to favor 48-pitch gears, as some of the 32- and 64-pitch combinations aren't practical owing to the way the motor mounts in relation to the spur gear.

Unfortunately, the Track Master instructions stop after the transmission assembly, and this is a problem. Unlike the other transmissions tested, Track Master's doesn't bolt to the chassis using the stock transmission mounting holes, but it mounts under the rear suspension blocks. This should be mentioned in the instructions. Because of this unique mounting method, the suspension geometry is altered, and the rear suspension blocks must be modified to fit properly. Some of the plastic must be trimmed away so that the mount fits flush against the bottom of the screws on the tranny mount.

When the formal performance tests had been completed, this tranny was installed in my stock-class RC10 (the one I used for the performance tests), and I also ran it in practice at our club's weekly dirt races. I expected the belt to stretch, but it didn't. Surprisingly, there's no provision for a dust cover to protect the spur gears and pinion gears. Just as surprising is the fact that the 48-pitch gears collected very little debris, even when running in dirt and mud. Of the transmissions tested, this one was the stiffest and most prone to binding when it was new, but that problem disappeared after about a dozen runs in the dirt.

Although one of the bearings on the primary cog shaft exploded, and it is a pain to adjust the diff through the right-side output adapter, the transmission is easy to maintain, and the cars I chased last year are now chasing me!

(Continued on page 114)

Competition Electronics

by ANDREW PHILIPS

TURBOCHARGER

TURBO. The word is almost synonymous with power, but until recently, you could only get a turbo for your full-scale car. Now the new Competition* Electronics Turbocharger will let you put some turbo kick into your R/C land missile.

The Turbocharger is the most complete charger on the market, and its features include: a pulse charge ranging from .01 to 9.99 amps; a 1-, 4-, 6-, or 7-cell discharge function; an average discharge voltage; an automatic cycle mode; and built-in voltmeter, ampmeter and timer.

Pulse charge: The Turbocharger's .01 to 9.99-amp pulse-charge range is convenient for the varied needs of the batteries now available.

One-, 4-, 6-, or 7-cell discharge function: This enables you to "match" your batteries. By discharging the cells at a certain rate, the charger will give the pack (or cell) the number of seconds of usable power that the battery can give at a 10-amp drain. By matching the cells' discharge rates, you can match your packs.

Average discharge voltage function: This gives another number used for pack-matching. During discharge, a reading of the pack's voltage is taken at timed intervals, and these readings are then averaged. This function is very important when cycling single cells, as it basically picks out the bad cells for you. When used on a pack, it will tell you what kind of speed the pack can deliver.

Automatic cycle mode: The full matching process. The Turbocharger takes your cell, charges it completely and discharges it. This is basically a "set-it-

Staying in charge of your batteries

and-forget-it" function, making the long, tedious job of matching cells a little easier. The cycle charge is at 3 amps. (*Editor's Note: The newer versions of the Turbocharger now come with a cycle charge of 4 amps. Competition Electronics will change the charge rate of your older Turbocharger for a nominal fee.*)

Built-in voltmeter and ampmeter: The Turbocharger is equipped with an "always-on" voltmeter and ampmeter so that you can monitor the charge of your packs.

Built-in timer: Competition Electronics includes a timer that starts automatically when a function begins.

With all these functions, you might assume that this unit is complicated to use. Not so! All functions are accessed with one of three keys: a start key; a dual-function increase/off key; and a function key.

There's only one display on the Turbocharger: a 32-character digital screen that allows the volts, amps, time and function being used to be displayed simultaneously. Myriad messages are displayed on this screen—more than I care to list!

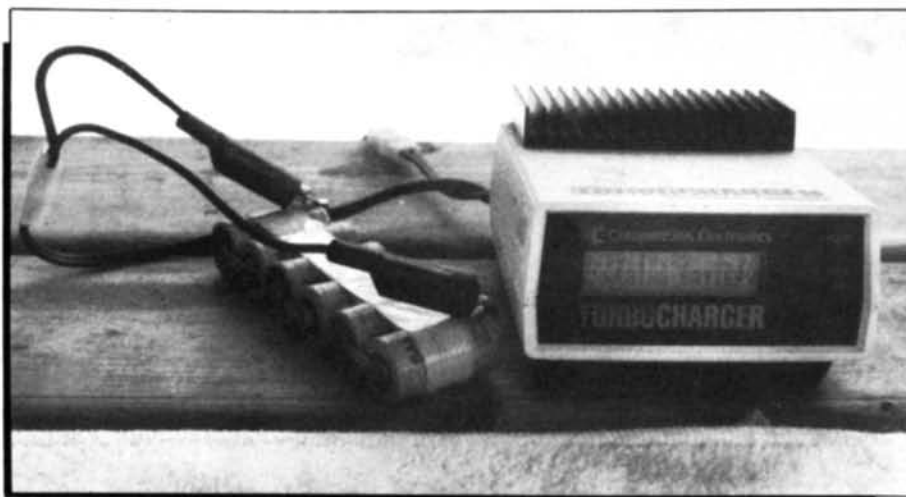


PHOTO BY WALLY DAVID

In short, the charger is "user-friendly"; you can completely understand it, even without reading the instructions.

So, how do you use it? After hooking up the battery, set your charge rate (anywhere from .01 to 9.99 amps), and hit

start! No problem! It's just as easy as any other peak charger (if not easier), since you know exactly what amperage (give or take a few hundredths) you'll charge at before you hit the start button.

This ease of use is also reflected in the Turbocharger's other functions; set it and forget it—it's *that* easy!

The Turbocharger is very resistant to radio interference. Interference has been a problem with some peak chargers, as a transmitter near a peak charger almost always results in a false peak. So I put not one, but two Magnum transmitters near the Turbocharger. I turned it on—1 cell, 5 amps. No false peak! I repeated the test with more cells. No false peak! I tried everything I could think of. No false peak!

There is an easy way to produce a false peak, though: Let your supply voltage drop to low. (This will happen when you're using a 12V car battery for supply.) When your batteries are taking too long to charge, hit the function button, and this will give you the supply voltage. Whenever it drops below 11 volts, it's time to do something, such as putting a 12V car battery charger on your 12V battery.

It's almost impossible to hurt a pack with this charger, but if you do, you can go back one cell at a time, using the cycle mode, to find out if any cells have been seriously damaged.

(Continued on page 128)





PHOTOS BY STEVE POND

INDY 500



Above: The father-and-son team of Mario and Michael Andretti driving the Chevy-powered Newman-Haas Lolas, ran strong for most of the day, but couldn't put it together for the win.

Left: The fastest front row ever to qualify at Indy (Rick Mears, Al Unser Sr. and Emerson Fittipaldi) head for the green flag for the 73rd running of the Indy 500.

Life begins at 230!

by STEVE POND

THERE ARE MANY other races, but this is *the one!* In R/C, we have the IFMAR World Championships, and in full-size racing, there's the Indy 500!

Just over 600 players participate in major league baseball *each season*, but since the first Indianapolis 500 way back in 1911, only 580 men and one woman (Janet Guthrie) have ever even *qualified* for the race. Of this select group of race car drivers, only 58 have actually reached victory lane.

The drivers who had managed to capture the limelight for this, the 73rd running of the Indy 500, are familiar: Rick Mears, Al Unser Sr., Al Unser Jr., Mario and Michael Andretti, Danny Sullivan, A.J. Foyt, Emerson Fittipaldi and others—a gallery of driving greats that could draw a six-figure attendance at a soap-box derby.

The Men

Mears captured the pole for a record fifth time with a fastest ever qualifying speed of 223.885mph. As a three-time win-



Above: Gary Bettenhausen's Lola/Buick was the fourth fastest Buick on the track, but engine problems put him out of the race before the green flag.

ner of the 500, Mears stood a chance to be the third man to win the elusive Indy 500 four times. To his right on the starting grid, teammate Al Unser Sr. was making a bid to win the Indy 500 for the *fifth* time. Al Unser Jr., who's following his father into racing's hall of fame, has scored a number of CART victories in road racing, but he has never won on an oval track and was looking to score his first. A.J. Foyt, the only other man to have won the Indy four times, was Al Sr.'s only rival to be a five-time winner.

Indy veteran Mario Andretti won once back in



Above: Favored to win his fourth Indy 500 title, Rick Mears makes his way around the third turn, while being stalked by Mario Andretti and Al Unser Jr. His hopes were extinguished when a blown engine put him out of the race on lap 113.



Around lap 190, Al Unser Jr. began to close the gap on Fittipaldi and eventually passed him, but not for long, as he slammed the wall on lap 198.



Chevrolet Indy engine, which now dominates Indy car racing, helped Rick Mears to a record qualifying speed of 223.885 and Emerson Fittipaldi to the checkered flag.



The new, controversial "white line" rule that states, "No driver shall have all four wheels under the white line for an extended period of time" caused some static, but just as Emerson is shown here getting ready to hang four, many other drivers did, without penalty.

'69 and, after 20 years of rotten luck, was making a bid for win number two. Mario's son and teammate, Michael, came 2nd in the 500 last year, and was in good shape this year with a qualifying speed of 218.774mph.

Former New York City cab driver, Danny Sullivan, crashed during qualifying and broke his right arm, but, owing to his excellent physical condition and the swift work of a top-notch surgeon, he was able to qualify with a special brace supporting his arm. With a slow speed of 216.027mph, his second attempt at qualifying landed him in the 9th row of 11, but he was still in the running. Emerson Fittipaldi filled out the front row by qualifying 3rd at 222.329mph.

The Machines

And what about the magnificent machines to which these drivers are wedded for the nearly three hours it takes to complete the 500 miles? (assuming no mishaps). Guts of steel and prayers have taken a back seat to auto technology, which, at the Indy, in

INDY 500

the words of Al Unser Jr. is, "second to none." These were the fastest closed-course racing machines.

The new kid on the block—the Penske PC-18—is the descendant of the PC-17, which took Rick Mears to the checkered flag last year. The new PC-18 is very similar to last year's victor, but it has a slightly lower, leaner, sleeker profile. Still with Chevy power, this car once again proved its superiority.

The front row was again dominated by Penske-designed cars. Behind them, and very much a threat, were the Lolas and the Marches. These British-designed cars had powerplants from Buick, Cosworth, Judd and Chevrolet, but they couldn't seem to match the qualifying speeds of the Penske/Chevrolet combos. The new Porsche was there, too, but the Porsche chassis had been swapped for a race-proven March while Porsche concentrated on the engine.

This year, analog gauges were replaced by new, high-tech, digital dashboards whose displays are connected to computerized systems that monitor almost every function of the car during the race. For the first time, some of the cars actually



Above: In the "calm before the storm," Bernard Jourdain's Corona machine sits along side the position pole. He was the top-finishing rookie driver.



Al Unser Jr. was the fastest car on the track, and had he not crashed in the final laps, he may have taken his first win at Indianapolis.

had a speedometer. In the past, drivers had to *estimate* their speeds with tachometers, but the new displays showed exact mph, fuel levels, fuel consumption and more—all at a glance! The result of this technology is ever-increasing speeds.

Only by taking a lap in one of these cars could you ever realize their performance potential. Going down the straightaways, the competitive cars reach speeds of almost 235mph, so they're traveling at over 340 feet per second—more than the length of a football field!

At these speeds, their 40 gallons of methanol fuel are burned at roughly 2.5 gallons a minute—faster than most kitchen faucets at full blast!



Above: The talented Newman-Haas crew makes some final adjustments on the formidable Chevy Indy engine.



BRICKYARD-INSPIRED R/C

R/C CAR RACING—especially the on-road classes—closely emulates full-scale racing. Interest in it comes from the enthusiasm generated by the full-scale sport, and racers soon develop a preference for a particular type of body.

CART racing, better known as Indy car racing, is one of the late-blooming classes in the R/C ranks. Until recently, there were no kits available in any scale for Indy cars, but the growing interest in full-scale racing has prompted the R/C industry to introduce a number of Indy styles in many scales.

The smallest of the fleet, Kyosho's 1/18-scale cars, featuring miniature modified motors and 270mAh batteries, are actually European Formula 1 cars that are detailed to look like Indy cars. Up one notch are Tamiya's 1/10-scale Road Wizard and Formula cars. Although the Road Wizard has been available for some time, it has become popular only in the last couple of years, and the Formula cars (also of European descent) are the newest additions to the fleet. Despite their European trim, each car can be easily outfitted in Indy trim by adding the correct decals.

Designed as a true CART racer, a 1/10-scale Lola is offered by MRP, and it has the popular Budweiser trimmings for the Lexan body. The only other route to take for a 1/10-scale Indy car is to fit a Lexan body on a current 1/10-scale pan car. You can choose from McAllister Racing's Penske PC-17 body, BoLINK's March body, Parma's Penske body, or MRP's Lola body.

The Titans of the Indy fleet are the new 1/4-scale cars that are already available from Race-tech (RACO and B&L Racing are developing their own). These 1/4 scalars feature 23cc gas engines and some of the technology that's used on the full-scale Indy cars.

There are a number of choices for the Indy enthusiast and, although the full-scale cars are financially out of reach for most of us, there's sure to be something within your budget in the R/C world!

by STEVE POND



Top: Kyosho's 1/18-scale Formula 1 cars can be detailed to look like Indy cars. Above: B&L's prototype 1/4-scale Indy car.



McAllister's sharp Penske PC-17 is one of the Indy car bodies available for 1/10-scale on-road racing.

Backing off to slightly more than 200mph through the turns, each of the cars will pull in excess of three Gs, so if you weigh 180 pounds, there would be more than 540 pounds of pressure pushing you to the right side of the car! Consider that the new street-car Corvettes have what's regarded as the best handling; they pull .90 Gs of lateral acceleration in turns. The Indy cars pull more than three times that force through 800 turns in less than three hours!

Tires are obviously important on any car, but at these speeds, they're crucial. A look at the tires through the on-

car camera shows a glossy tire surface as the cars blaze down the straightaways. Then, as the car takes the turn at almost four times the national speed limit, the part of the tires still touching the ground is under such a tremendous load that it instantly becomes a deep matte black as the rubber virtually peels off the tire. Got the picture?

The Place

Since the Indianapolis Motor Speedway was constructed in 1909, its configuration has remained unchanged. Over

INDY 500

INDY 500 RESULTS

Final Posit	Car No	Driver	Laps Comp.	Car	Engine	Car Name
1	20	Emerson Fittipaldi	200	1989 Penske	Chevy Indy	Marlboro Racing Team
2	2	Al Unser Jr.	198	1989 Lola	Chevy Indy	Team Valvoline-Stroh Light
3	30	Raul Boesel	194	1989 Lola	Judd	Domino's Pizza "Hot One"
4	5	Mario Andretti	193	1989 Lola	Chevy Indy	K Mart Havoline
5	14	A.J. Foyt	193	1989 Lola	Cosworth	Copenhagen-Calumet Fm-Clymor
6	22	Scott Brayton	193	1989 Lola	Buick V-6	Amway-Speedway-Uniden
7	50	Davy Jones	192	1988 Lola	Cosworth	Euromotorsport/Uno
8	29	Rich Vogler	192	1988 March	Cosworth	Byrd's Cftra/Bryant/SatEvePost
9	69	Bernard Jourdain	191	1989 Lola	Cosworth	Corona Racing-Monarch Sports
10	3	Scott Pruett	190	1989 Lola	Judd	Budweiser Truesports Lola Judd
11	65	John Jones	189	1989 Lola	Cosworth	LaBatt's Prototab Racing Team
12	81	Billy Vukovich III	186	1989 Lola	Judd	Hemelgarn/Consani/Sierra
13	71	Ludwig Heimrath Jr.	185	1989 Lola	Judd	Mackenzie Indus. Grp/Hemelgarn
14	33	Rocky Moran	181	1987 Lola	Cosworth	Skoal Bandit
15	10	Derek Daly	167	1989 Lola	Judd	Raynor Garage Doors
16	56	Tero Palmroth	165	1989 Lola	Cosworth	Neste/Rotator/Nanso
17	6	Michael Andretti	163	1989 Lola	Chevy Indy	K Mart Havoline
18	86	Dominic Dobson	161	1988 Lola	Cosworth	Texaco Havoline Star
19	15	Jim Crawford	135	1987 Lola	Buick V-6	Mac Tools Dist/Planters Buick
20	12	Didier Theys	131	1988 Penske	Cosworth	Arciero Wines/Arciero Macphers
21	9	Arie Luyendyk	123	1989 Lola	Cosworth	Provimi-Dutch Boy-Uniden
22	24	Pancho Carter	121	1989 Lola	Cosworth	Hardee's
23	4	Rick Mears	113	1989 Penske	Chevy Indy	Pennzoil Z-7 Penske Chevrolet
24	25	Al Unser	68	1989 Penske	Chevy Indy	Marlboro Penske Chevrolet
25	70	John Andretti	61	1988 Lola	Buick V-6	TuneupMaster/Granatelli/Buick
26	18	Bobby Rahal	58	1989 Lola	Cosworth	Kraco Racing Team
27	7	Tom Sneva	55	1988 Lola	Buick V-6	STP-Granatelli-Buick
28	1	Danny Sullivan	41	1989 Penske	Chevy Indy	Miller High Life Penske Chevy
29	28	Randy Lewis	24	1988 Lola	Cosworth	Toshiba-Oracle/Teamkar
30	8	Teo Fabi	23	1989 March	Porsche	Quaker State Porsche
31	91	Gordon Johncock	19	1988 Lola	Buick	STP/Hemelgarn/Pizza Hut-WRTV
32	11	Kevin Cogan	2	1988 March	Cosworth	Schaefer/Playboy/Machinists
33	99	Gary Bettenhausen	0	1987 Lola	Buick	ATEC Environmental Buick

its 2.5-mile length, the 50-foot-wide oval track has two $\frac{5}{8}$ -mile straightaways, $\frac{1}{8}$ -mile straights at each end, and four turns that widen to 60 feet. The banking is a mere 9 degrees, which doesn't sound like much, but remember the *speeds* at which these cars are traveling!

Only the track's surface has changed. Starting in 1937, parts were surfaced with asphalt, and the track and pit road were completely resurfaced after the '88 race. This allowed blinding speeds during this year's qualifying.

The Race

A tense crowd, a raised flag, the world's best drivers: "Gentlemen, start your engines!" At 11 a.m. on May 25, 1989, the fastest field ever to run at the Indy 500 roared to life as Mary Fendrich Hulman (wife of the late track owner Tony Hulman) belted out the familiar four words.

A field of 32 cars rolled away to begin the first of two parade laps before the final pace lap, while, back at the starting grid, the crew of the 33rd car, (driver, Randy Lewis) worked frantically to get the car started. As the cars made their way around to the front straight again, the crowd had a clear view of these cars; but for the following three hours, they were somewhat blurred!

When passing the pit road for the final parade lap, Gary Bettenhausen's car suddenly stalled, and his frenzied crew discovered that the camshaft had probably broken. Bettenhausen's hopes of fulfilling his father's dream were smashed for yet another year. Imagine the disappointment of coming so far only to be defeated before the game begins! The rest of the field made its way around the track once more as Bobby Unser, driving the Trans Am Pace Car, brought the speed up to over 80mph



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for the pace lap. Coming around turn four, the pace car darted down the pit road as the field brought the speed up over 200mph for the green flag.

In the Chevy-powered Penske PC-18, Emerson Fittipaldi ran for an early lead, and by the end of the first lap, he had put about 3 seconds between him and the 2nd-place car. Although there were still 497.5 miles to go, this pace was very impressive, and if it was any indication of things to come, the favorite, Mears, would have his work cut out.

During lap three, Kevin Cogan touched the outside wall, and this sent him into a spin and the most devastating crash of the race. His car slid across the track to the inside wall, where a tail-first collision split his car in half. His speed carried him into the end of the pit wall; he bounced off this and then into the inside pit wall where what was left of the car came to rest. Had this happened 10 years ago, the race would have been marred by yet another death, but the improved safety features of the new cars and driving suits allowed Cogan to walk away!

Having lost his lead in lap three, the green flag flew again for Fittipaldi in lap 12, and his consistent laps of over 215mph forced the others to play "keep-up" and hope that he'd have some mechanical trouble.

The first sign of disaster for the favored Penske Team came in lap 41 when, only four laps after his scheduled pit stop, Danny Sullivan entered the pits to check a problem he was having with his car. His broken arm was holding up well, but his car had developed a clutch problem, and although he tried to re-enter the race, his clutch was slipping so badly that he was forced back to the pits, defeated.

After a couple of lightning-fast pit stops (the crews are almost as fast as the cars!), Fittipaldi was still in the lead and relatively unchallenged. Around lap 50, Michael Andretti passed his father for 2nd place, and he then set his sights on Fittipaldi. During lap 55, a yellow flag (Bobby Rahal ran out of gas on the track) allowed Andretti Jr. to close the gap, and defeat became a definite possibility for Fittipaldi.

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INDY 500



Soon after this, Al Unser Sr. rolled into the pits for an unscheduled pit stop with the same problem that had grounded teammate Danny Sullivan 30 laps earlier.

When Fittipaldi stopped for a scheduled pit stop, Michael Andretti took the lead for a few laps, but *his* scheduled pit stop put him back into 2nd place. Lap 115 brought the end of Penske's hopes for victory, as his record-setting PC-18 (driven by Rick Mears) emitted smoke when its Chevrolet engine was unable to withstand the severe stresses of racing. Lap 128 brought another drama when Arie Luyendyk blew his short-stroke Cosworth engine on the front straight and sprayed the track with oil and water. Ever hit an oil patch while driving?! You can bet this slowed things down!

Fittipaldi took this opportunity to make a quick fuel stop. What should have taken about only 12 seconds was extended to almost 40 seconds, however, when a particularly sharp crew member noticed a blister in one of Fittipaldi's hard-compound Goodyear tires. After hauling out the gear, the crew changed all four tires, and this 40 seconds eventually cost Fittipaldi the lead—but might have saved his life!

During lap 139, a yellow flag (Jim Crawford's car had died on the track) gave Fittipaldi his chance to challenge Andretti. They headed for the pit at almost the same time, but the Patrick crew got Fittipaldi going first, so he was back in the lead. Fittipaldi was still leading at the start of lap 152, but this was the lap in which Michael Andretti passed him and set his sights on the checkered flag.

Running away with the lead, Michael Andretti was afflicted by the bad luck that has plagued his father for years at Indy: His engine blew on the front straight, just as he was crossing the line for lap 163. The subsequent yellow flag gave Al Unser Jr. a chance to close the gap for 2nd place, and during his next stop, he only took on enough fuel to finish the race.

Another misfortune—this time, for Tero Palmroth, whose tire fell off—caused yet another yellow flag, and this was good for Unser Jr. Fittipaldi came into the pits for fuel, while Unser decided to gamble with what he had left and try to pick up some time while Fittipaldi was refueling. Fittipaldi managed to get out of the pits just ahead of Unser, and this set the stage for the final confrontation. With Fittipaldi's lap times slowly dropping, Al Jr. made a strong charge for the finish, slowly picking up time, lap after lap.

Eventually, on lap 195, Unser passed Fittipaldi, and he was able to hold a marginal lead until lap 198, when the *real* battle began. Fittipaldi had managed to duck inside Unser in the short chute between turn three and four. When they came upon slower traffic, Unser Jr. made an aggressive move for the inside to get around it, and he almost forced Fittipaldi off the track. Unser continued to squeeze Fittipaldi to the inside, hoping to box him into a slower car and pass him for the lead. The cars touched tires, and this sent Unser into a spin, into the wall and into 2nd. That was the end of the race; Fittipaldi's victory became a certainty. At the end, it was Emerson Fittipaldi, Al Unser Jr. and Raul Boesel; Fittipaldi had taken the lead initially and kept this early promise, leaving others to say, "If only ..."

Meanwhile, the rest of us stopped biting our nails, clenching our fists and screaming ourselves hoarse and started looking forward to the excitement of *next* year's amazing Indy 500! ■

CHEVY-SPONSORED CARPET CRAWLERS

by WALLY DAVID

NARCTPA GRAND NATIONALS

WHAT'S 24 INCHES LONG, weighs 30 pounds and can pull 200 pounds?—a vehicle entered in the Super Modified Class of the North American Radio Control Truck Pulling Association's Grand Nationals, that's what!

The Grand Nationals, hosted by One Stop Hobbies of Livonia, MI, and held at the Plymouth Cultural Center and Ice Arena, was the culmination of the NARCTPA's '88-'89 points championship. The members of the NARCTPA get together once a month to compete and earn points toward the championship. Because this was my first major truck-pulling event, I wasn't prepared for the seriousness evident in the faces of the competitors. It was quite apparent that a lot of expense and even more time goes into the creation of these vehicles, 98 of which competed during the weekend.

Even more surprising than the demeanor of the competitors was the number of spectators on hand. Event promoter Don Grindy, of the NARCTPA, told me that over 1,000 spectators paid their way into the ice arena. I had no idea that R/C truck pulls were this popular with the pullers, much less with spectators. It would be nice to see that many people at R/C races!

Just like full-size truck pulls, the Grand Nationals had



Twenty Bird isn't really driving the Pro Puller 2. This truck tractor proudly carries the Radio Control Car Action logo.

a very big sponsor: Chevrolet (the company, not a dealership) provided banners, T-shirts and special-effects lighting, and it also displayed two tricked-out full-size pickup trucks. One was its small S-10 truck with a new Baja accessories package; the other was a truck painted like the USA 1 monster truck. To my knowledge, NARCTPA is the only pulling group with major sponsorship from a large non-R/C-related company. In fact, Chevy is sponsoring the NARCTPA's whole '89 season, and it will display the trucks at each event. If more companies became involved in this way, it would benefit all types of R/C competition.

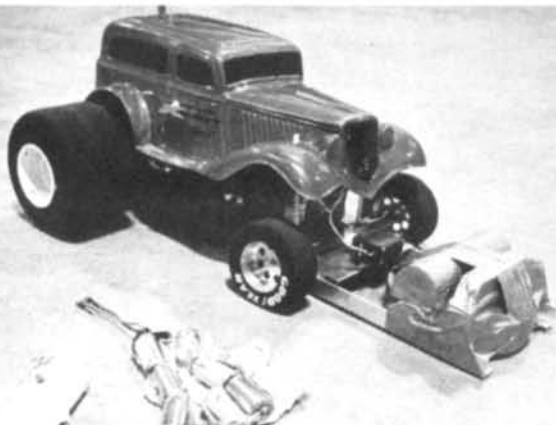
The track for pulling was a 4x20-foot stretch



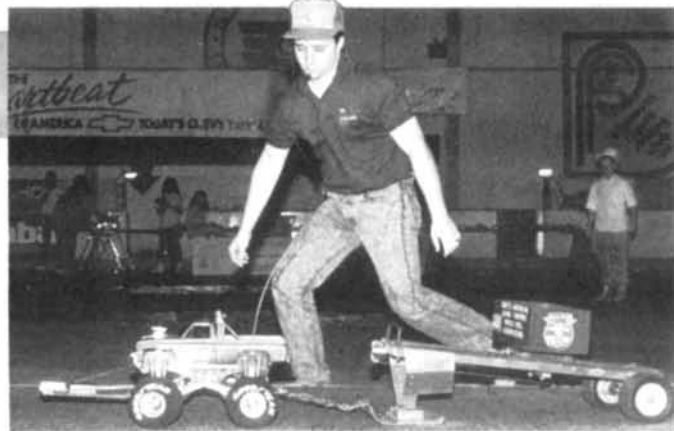
John Beecher works on the Super Modified Pro Puller 2. Notice the detailed body with six engine replicas.



Mike Sliwa's Wild Thang II finished 2nd in the Super Modified Class. The transmissions are from two electric kiddie cars. Two Astro Flight Marine motors and four 7-cell packs propel this awesome puller down the track.



The K-Mart Special of Art Vassallo burned up two battery packs on the way to 3rd in the Super Modified Unlimited Class.



Track Steward Gene Moodye watches closely as Wild Thang, driven by Mike Sliwa, makes its way down the track.

of carpet on an elevated wooden platform. Pulling on carpet eliminates the problem of inconsistent track conditions. With that variable out of the way, pullers can concentrate on weight balance and gearing. All lights in the arena were turned off, except for a strip of lights directly over the track. This really helped to focus everyone's attention on the matters at hand, as only one truck pulled at a time. When a full pull was achieved, red flashers and sirens went off. What a show!

The Grand Nationals were held over a two-day period. Saturday's activities included two rounds of pulls: The first round

served as a practice, as no practice was allowed before the event started; the second round of pulls determined the 10 vehicles in each class that would advance to the finals on Sunday.

Five classes of vehicles pulled during each round:

- The Pro Stock Class consisted of 2WD cars or trucks (basically box stock). Tires could be changed; only four wheels were allowed (no multiple-wheel setups); there was a 9-tooth pinion minimum; any after-market speed control, oil shocks or stiffened suspension and ball bearings were allowed. Any 540 modified motor or 05 Astro Flight motor was also permitted, and 6-cell sub-C battery packs were required. This class consisted mainly of Lunch Boxes, Midnight Pumpkins, Blackfoots and Monster Beetles.
- The Four Wheel Drive Limited Class, which was dominated by the MRC Clod Buster, was for box-stock 4WD cars and trucks only. Only the pinion gear, speed control and bearings could be changed.
- The Sportsman Class consisted of 2WD or 4WD cars and trucks with one motor. Clod Busters, which again made up most of this class, could only run one motor. Any 540, 750, or Astro Flight 05 motor with one 7-cell sub-C battery pack was allowed. No multiple-wheel setups or ex-

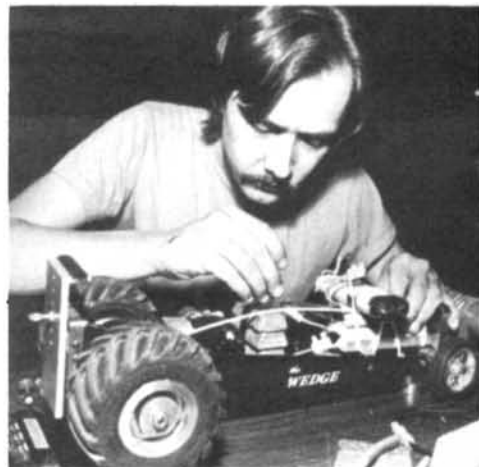
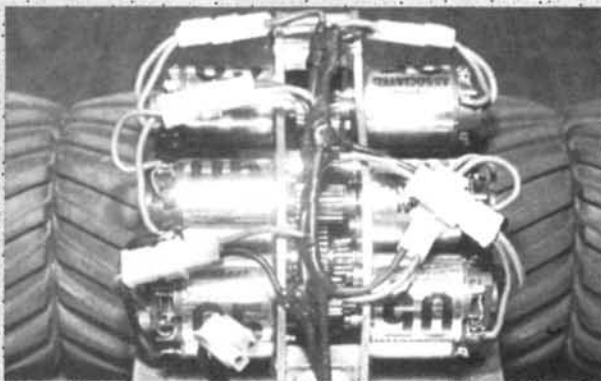
WACKY WEIGHTS, MULTIPLE MOTORS AND GONZOID GEARS

Pulling large amounts of weight isn't a mystery: Just combine the correct blend of vehicle weight balance, motor power, batteries and gears. Sounds simple, right?

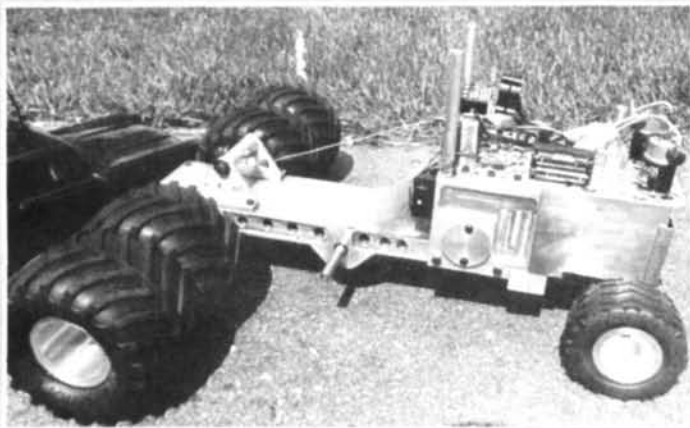
Wrong! Only the weight is uncomplicated: Load the vehicle with as much weight as the rules allow, and balance it to give enough rear traction without lifting the front end.

The other elements involve many theories and each has a unique, practical application. For example, Don Wyatt's Blue Ox used eight Associated 05 stock motors and four 7-cell packs with a gear ratio of 140:1 in his handmade transmission. Larry Logan's Worm used two Astro Flight 05 motors and two 7-cell packs to power his gear- and chain-drive vehicle, with a gear ratio of 450:1. Brad Gale's scratch-built Bull Dog ran with four 360ST motors and four 6-cell packs, and the ratio was 75:1. At least three vehicles used gearboxes from electric kiddie cars. Now, if that isn't resourceful, I don't know what is!

There's no one combination that works for everybody, but that's what makes pulling so interesting and challenging.



Dan Carlisle adjusts the weight on the Wedge, made by C&S Manufacturing. The Wedge competed in Super Modified.



Larry Logan's *The Worm* is completely scratch-built of T6 aluminum. It has a 450:1 gear ratio and uses two Astro Flight 05 motors and two 6-cell packs for power.

melted two battery packs on the way to 3rd and pulled 15 feet, 2 inches.

Also part of the action at the Grand National was a Demolition Derby, and a Car Crushing Obstacle Course. One Demo Derby was held on Saturday and two more on Sunday; the winners of each round would meet for a final, all-out, smash-up derby. The only rules were that a 6-cell sub-C battery pack had to be used, and combatants continued until there was only one car left running. Jack Lapan drove his Futaba FX-10 to victory over Darrel Vassallo's Traxxas Street Cat; Danny Vassallo was 3rd with his Midnight Pumpkin. Clod Busters were the favorites going in, but they didn't have the

THE NORTH AMERICAN RADIO CONTROL TRUCK PULL ASSOCIATION GRAND NATIONALS

Class	Driver	Name	Chassis	Weight	Distance
Pro Stock*	Derk Belt	The Well Digger	Blackfoot	50 pounds	17 feet, 4 inches
4WD Limited*	Bill Cripps	Heavy Hauler	Clod Buster	51 pounds	20 feet
Sportsman*	William J. Watkins	The Reaper	Clod Buster	150 pounds	16 feet, 8 inches
Superstock*	William H. Watkins	The Hunter	Clod Buster	250 pounds	17 feet
Super Modified	Charles Allen	Bennett Equip. Tractor	Bennett Equip. Tractor	200 pounds	20 feet
Super Mod. Unlimited	Harry Waltz	Junk Yard Dog	Scratch-Built	300 pounds	20 feet

* Pull-off required

In the Pro Stock Class, the final pulls were at 50 pounds. First place went to Derk Belt. His Blackfoot—the Well Digger—went 17 feet, 4 inches. Art Vassallo's Big Brute—the Outlaw—pulled 16 feet, 5.5 inches, and Tim Gale's High Rider Vette—the Fine Line Puller—was close behind at 16 feet, 4.5 inches.

The 4-Wheel Drive Limited Class final pull weight was 51 pounds, and the top three pullers were all Clod Busters. Driving the Heavy Hauler, Bill Cripps claimed the top spot with a full pull of 20 feet; Rodger Jean's Puddle Jumper was 2nd with a pull of 14 feet, 5 inches. Judi Wyatt—the only woman to place in the top three in any class—drove Tickled Pink to 3rd place with a pull of 13 feet, 7.5 inches. Coincidentally, she won her truck in a raffle held at last year's NARCTPA Spring Nationals. Even more coincidental is the fact that she won another Clod Buster during *this* weekend! Maybe next year she'll compete in *two* classes!

The top three in the Sportsman Class were also Clod Busters. William J. Watkins pulled the sled for 16 feet, 8 inches with his Reaper; William H. Watkins (father of William J.) drove his Stinger to 2nd with a pull of 14 feet, 4.5 inches; and

Kurt Walenty's Raw Power was 3rd with 5 feet, 11 inches at 90 pounds.

In the Superstock Class, William H. Watkins came in 1st with his Clod Buster, the Hunter, by pulling 250 pounds for 17 feet. Kurt Walenty's 2nd-place Project Power Clod Buster pulled 15 feet, 10 inches at 250 pounds. The Crazy Horse II—a Clod Buster driven by Jim Durand—pulled 15 feet, 8.5 inches at 250 pounds.

When all the other classes had been run, it was time for the Super Modified Class to rip up the carpet. Just like at the full-size truck pulls, this is the one most people come to see. Taking 1st place with his Bennett Equipment Tractor was Charles Allen with a full pull of 20 feet at 200 pounds; Mike Sliwa was 2nd with Wild Thang II at 16 feet, 9 inches and 200 pounds; Don Wyatt (referred to as the "Father of The Super Modifieds" in the NARCTPA, and also the husband of Judi Wyatt) came in 3rd when his Blue Ox pulled 15 feet, 9.5 inches at 200 pounds.

In the Super Modified Unlimited Exhibition Class, Harry Waltz used his Junk Yard Dog to pull 300 pounds the full 20 feet. Brad Gale's Scratch-Built Bull Dog took 2nd with a pull of 16 feet, 7.5 inches. With his K-Mart Special, Art Vassallo

battery life to last. The trick was to use a stock motor and pick the right moment to strike.

The only thing to say about the Obstacle Course is that it might be better if the members of the NARCTPA stick to going *straight*, because they didn't seem to have a real handle on turning.

With their walkie-talkies or radio headsets, the NARCTPA officials were extremely efficient, very helpful, and relayed important information rapidly. Track Steward Gene Moodey gave the distance of each pull directly to the announcer, so the spectators didn't have to wait for the results. Security in the pits was tight, which meant that only pullers and registered crew had access to the area. Overall, the event was run very professionally.

The 98 entries and 1,000 spectators really seemed to enjoy the Grand Nationals. With entrants coming from Wisconsin, Indiana, Pennsylvania, New York, Illinois, Ohio, Nebraska and Canada, as well as the home-state Michiganders, I can't see any reason why this part of R/C car competition won't continue to grow. Who knows? In the future, perhaps we'll see these scaled-down pullers on the same bill as the big boys. ■

INSIDE SCOOP

by CHRIS CHIANELLI

The R/C CAR industry is rapidly advancing, with new products being offered at a head-spinning rate. So, I'll make manufacturers nervous, but feed you R/C squirrels who are hungry for info, by bringing you a special report on security leaks and "late-in" items. Here goes!



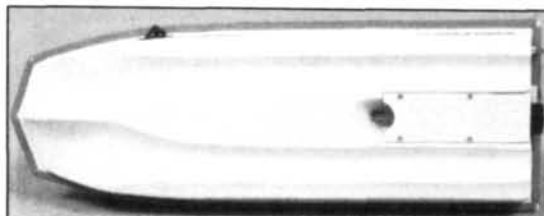
THE BARON'S BODY-SHOP IS OPEN

Coverite has just announced its new Bodyshop line for R/C cars. This line of paints, pinstripes and trim sheets has been tested by Richard Muise of Motion Graphics, who says, "The average hobbyist will be able to achieve a multicolor job the very first time using Bodyshop's paint on the inside and Bodyshop's trim on the outside." With Coverite's background in paints and trim materials for R/C airplanes, you can be sure the Bodyshop line will soon be readily available at hobby shops.



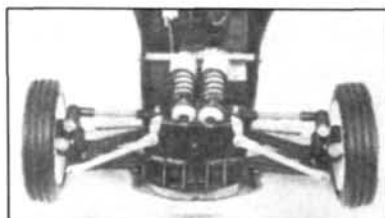
BOLT-ON TWO-SPEED TRANNY

This is Nova's modular two-speed transmission for 1/10-scale cars. The unit is bolted to the car where the motor would go, then the motor is attached to it. I don't think anyone is bringing Nova products into the U.S. at this time, but someone *should* be.



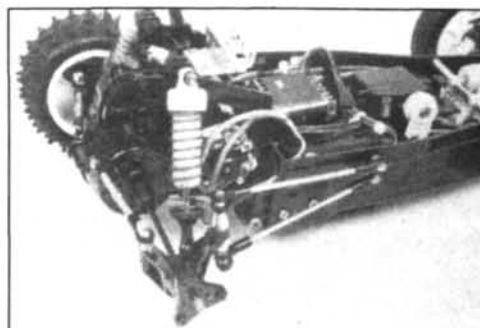
1/4-SCALE JET SKI

This 540-powered 1/4-scale Jet Ski is 20.8 inches long and uses all 1/10-scale car-type electronics (note the 6-cell stick pack). This model features tunnel-jet-drive, just like the full-scale jet ski! Note steering nozzle (also similar to the full scale) that exits at the transom; much lower drag than a rudder.



FULLY INDEPENDENT GRASSHOPPER

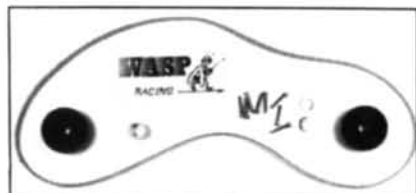
Many of you have asked if cars like the Frog and Hornet could compete in the Worlds if they were properly equipped and modified, and I've answered that it's highly improbable. Here's one industrious Grasshopper owner who's out to prove me wrong, and he went to great lengths to do it! The diff case is rigidly mounted to the chassis. Some unidentified Tamiya hubs and spindle carriers are connected to the outside of the chassis



with dual radius arms (à la the JR-X2). A third link goes to the inboard chassis, and two more links connect to the diff case. The front suspension has been modified with inboard, horizontal, oil-filled shocks (take a look at the Top Cat in this issue). Upper arms and Black-foot/Frog carriers have also been added to deal with the drastic camber-change problem encountered with the stock Grasshopper/Hornet. Wow! Watch out for this one, Joel!

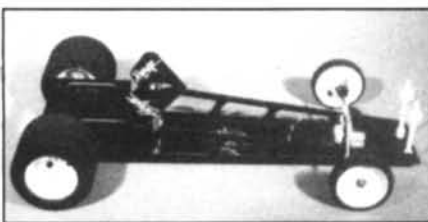
LOSI COOKS IN BAKERSFIELD

At the NORRCA Nationals, Team Losi took the team cup by 12 points. Losi driver Jack Johnson took first in 2WD Open (using the optional H-arm rear end), 2WD Stock (also with the H-arm rear end) and Open Monster (with the 5-link rear). Jay Halsey took the 4WD Open with a YZ10, while Dominic Sellers won 4WD Stock with an A&L car.



WASP DRIVE!

Stormer Racing of Glasgow, MT, now imports the European Wasp belt-drive conversions. Kits will soon be available for the Optima Mid, the YZ10 and the Schumacher Cat.



CARBON-FIBER PRO STOCK

Houge Enterprises, of Orlando, FL, who brought us the Illusion—a 1/10-scale graphite rail—has introduced a 1/10-scale pro-stock dragster called the Phantom. In addition to its rigid graphite chassis, the Phantom includes an aluminum-tipped graphite axle, a graphite radio tray, lots of hardware and many glass-filled parts.

CHEVY VERY LONG BED

For you "Bad Brain" O'Brien types who love six-wheeled trucks, Parma is stretching an '89 Chevy Fleetside pickup 4 inches, so two sets of drive wheels can fit under the bed, which will be shallow for the sake of clearance. This body is sure to be a big hit in the truck-pull community as well. Parma will also introduce a Cyclone II motor this fall. The TQ Series Modified is hand-wound.

HYPER RUBBER

S.S. Industries, who brought you the Hyperdrive, just took 8th in the ROAR On-Road Nationals A-Main in Birmingham, AL, using its new rubber. The new foam-tire line has five compounds for the rear and five for the front. These are extended-wear tires, and the "gold dots" are ultra-long wear, which, S.S. claims, will last five times longer than standard foams.

FLASH! KYOSHO STILL AT IT

Here we go again! This time, it's an all-new world-class 4WD car called the Legend. Kyosho's entries in the off-road market have been very competitive in the past few years, so this new off-roader will make purchasing decisions that much more difficult. Maybe they shouldn't make them so good!

Keeping the industry BUGGED, I'll see you next time—or sooner, if I catch you in my spyglass! CC

COMING NEXT MONTH! DIRT OVAL SPECIAL!



SPECIAL TECH FEATURES:

Dirt-Oval Motors
Side-dam Technology
Dirt-Oval Tires



REVIEWS:

Custom Works Dominator
Yokomo YZ-10
RCRC Ascot Sprinter

SHOOTOUT:

RC10 vs. JR-X2

BONUS:

Dirt-Oval Buyer's Guide

VON ERICH'S CLASSIC STREET-ROD



IMMORTALIZED ON FILM and in song, the 1932 Ford has become the image of the classic hot-rod. The Deuce Coupe is equally attractive in hot-rod primer (grey suede) or any of today's wild paint colors and contemporary graphic treatments. Just about every engine ever manufactured has been set between the Deuce's frame rails at one time or another. The drive lines have included transmissions from La Salle three-speeds to modified late-model automatics, with rear ends from the original torque-tube design to fully chromed I.R.S. Jaguar units. You can still build a full-scale Deuce Coupe, but it will probably be more like a model car than a real one; most available frames are custom-made, and the bodies are fiberglass replicas.

R/C street machines aren't built to be raced (at least, not formally); they're usually built as "show-'n'-go" models, with the emphasis on appearance and motivation. My last street-rod (see the December '88 issue of *Car Action*) was sharp-looking, but it was styled along contemporary lines. I wanted this car to have a *classic* look, so I chose the BoLINK* '32 Ford coupe as a base. There were several reasons for this

LI'L DEUCE COUPE

by ERIC GOLDSCHRAFE

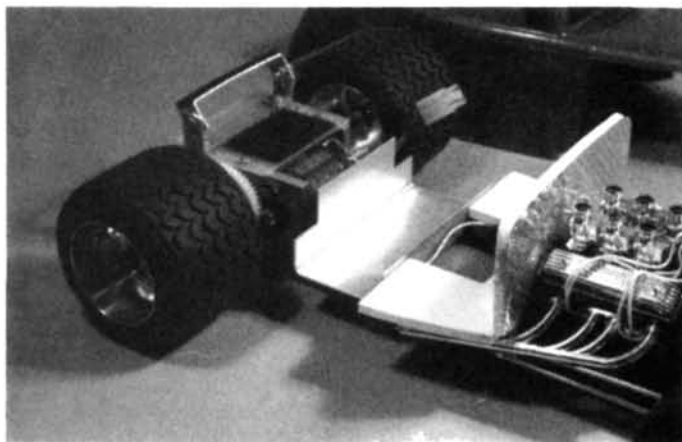
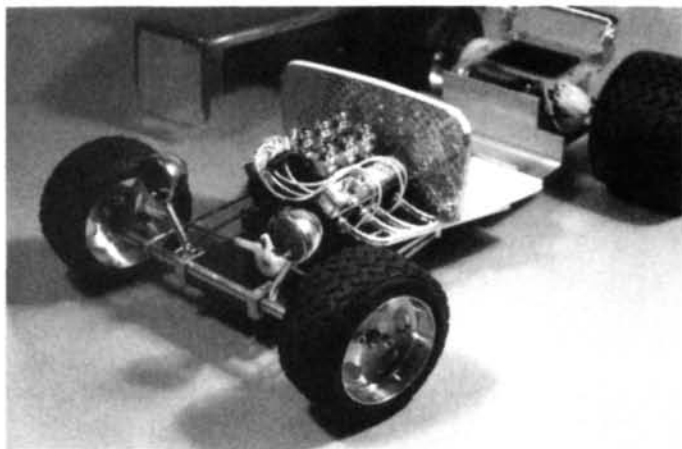


PHOTO BY STEVE POND



Removing the side panels from the hood on the BoLINK body to expose the engine is a simple operation. The Advance aluminum Mini-Mags wheels add a nice touch.

Below: Dahm's sunburst foil was used to simulate an engine-turned aluminum fire wall, which complements the Stromberg six-pack and the yellow ignition wires. The kit's front axle lends itself well to the old-fashioned, straight-axle look appropriate to cars of the '32's Ford era.



The Mickey Thompson-like Advance Grand-Prix tires look right on a hot rod. Note the aluminum Velcro body mount. This system works well and keeps the outside of the body clean.

choice: I wanted to cut off the fenders, running boards, and the hood side panels, and this is easily accomplished on this shell. Since there aren't any molded-on headlights, there was no need to try to save them or to butcher the grill shell. The trimming is easily done with a hobby knife, and any rough edges can be touched-up with a sanding drum on a motor tool.

The chassis was the easy part: I used the popular Advance* Custom Street Machine kit that will fit any manufactured body—even this cut-down coupe. Using the rear axle as the fixed point for the wheelbase, I moved the front-axle assembly around on the fiberglass-sheet chassis to achieve the desired wheelbase.

(There are several sets of locating holes here to get it just right.) Since the kit's front axle simulates the old-fashioned straight axle, I cut off the protruding end of the chassis plate. Make sure you have it right before you cut the fiberglass, because a repair would jeopardize structural integrity.

I spray-painted the chassis black and assembled it according to the instructions. When all metal parts had been highly polished with paper of increasingly fine grit, I put on a final shine with automotive rubbing compound. This was a time-consuming and somewhat dirty

job, but the results are worth it! I chose Advance's slotted aluminum mini-mags and polished them to a chrome-like luster. Real rubber tires, with a tread pattern like that on full-size Mickey Thompson street tires, were fitted to the rims and secured with a fine bead of ACC cement. I couldn't resist the full-scale trick of using Armor All on the tires to deepen the black color and give them a sheen.

I added Futaba* R/C system with the steering servo located behind the body-grill shell. In my junk box, I found a V-8 engine assembly left over from an old 1/8-scale plastic hot-rod kit, and it looked really neat for this project. I carefully notched out the engine block to fit over the servo, and it effectively hid most of it. The servo blends right in with the black engine and the chassis, and the only giveaway is the white, nylon servo-saver where the crankshaft damper pulley ought to be. Chromed plastic valve covers and headers draw attention to the dummy engine, and a closer look reveals a six-pack of Stromberg 97 carburetors on top and yellow silicone ignition wires running from the distributor to the spark plugs. With the body removed, the chassis appears to have a souped-up 303-cubic-inch Olds Rocket V-8 steering servo!

With the standard kit battery holder, a 6-cell (or more) battery pack can sit crossways in front of the motor and still be covered by the body. The receiver and electronic speed control also fit in easily and are completely hidden from view under the cut-down body. A fire wall, cut from artist's foam-core board and trimmed to fit the opening at the front behind the engine, was mounted to the chassis with a couple of foam-core brackets. To simulate an engine-turned aluminum fire wall, I cut out and applied a piece of Dahm's* sunburst foil to the exposed side of the foam core. This dramatic effect highlights all the engine detail. For some healthy per-

HENRY'S DEUCE COUPE ROCKS ON!

SHE'S MY LITTLE deuce coupe; you don't know what I've got ... "The Beach Boys sang its praises; Harrison Ford had his doors blown off by one; every kid from the '50s onward salivated over it; and Henry Ford ushered in a new era of automotive legends with it—the '32 Ford, known to countless

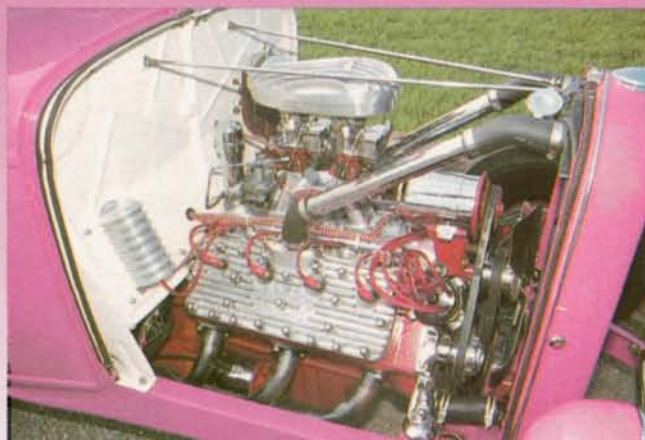
generations of street-rodgers simply as "the Deuce."

The Deuce became everybody's favorite hot-rod for many different reasons. For one thing, it had a certain jaunty body line that set it apart from the Model A, which directly preceded it. Even though the body style only lasted a



PHOTOS COURTESY OF "HOT ROD" MAGAZINE

by BUDD DAVISSON



This 255-cubic-inch '52 Merc flat-head obviously got the full chrome treatment.

year, the details of its design are burned into every rodger's mind.

But it was the car's mechanical character that probably first earned it superstar status in the street-rod community. It seems Henry was facing stiff competition from the folk at Chevrolet and Dodge, so whereas his Model T ran for nearly 20 years before metamorphosing into the Model A, the A only ran four years ('28 to '31) before the Deuce was born. Henry would have to pull

a real rabbit out of the hat, however, if he was going to conquer both the competition and the Depression. And he did!

That "rabbit" was the flat-head V-8 engine, and this little cast-iron thunker really worked. It nearly turned the '32 Ford into a sports car—at least, in terms of performance. The Deuce's frame was a simple steel ladder, but it was beefier than earlier frames and, with the V-8 mounts already in place, it was a natural for hot-rodgers. Some 20 years later, when Chevy introduced its V-8, street-rodging took on an entirely new look, as the small-block Chevy replaced the flat-head almost instantly. Courtesy of Chevrolet, the Deuce became the speed freak's dream.

The coupe actually came in two body styles: the five-window and the three-window. The obvious difference between them was that the three-window version lacked the little windows behind the doors. A subtler variation was the three-window version's "suicide" doors: They were hinged at the back, not at the front, and they opened in a direction that's opposite the one we're used to.

When it comes to modifications, the basic ones are obvious: First, the car may or may not have had fenders. The older rods didn't; the newer ones did; and the really new ones have them taken off again. Then there's the question of body height. If the body is sitting on top of the frame (as manufactured) and has no fenders, it's a "high boy" (the yellow five-window in "American Graffiti" is an excellent example); if the floorboards were cut loose and the body lowered over the frame, it was "channeled."

The total number of '32 Fords built, in all models, was incredibly small, and the number still surviving is even fewer. Now, however, complete body and chassis kits are available, and they're better in almost every way than the originals. And fiberglass doesn't rust. So, in one form or another, the venerable old Deuce will rock and roll forever. ■

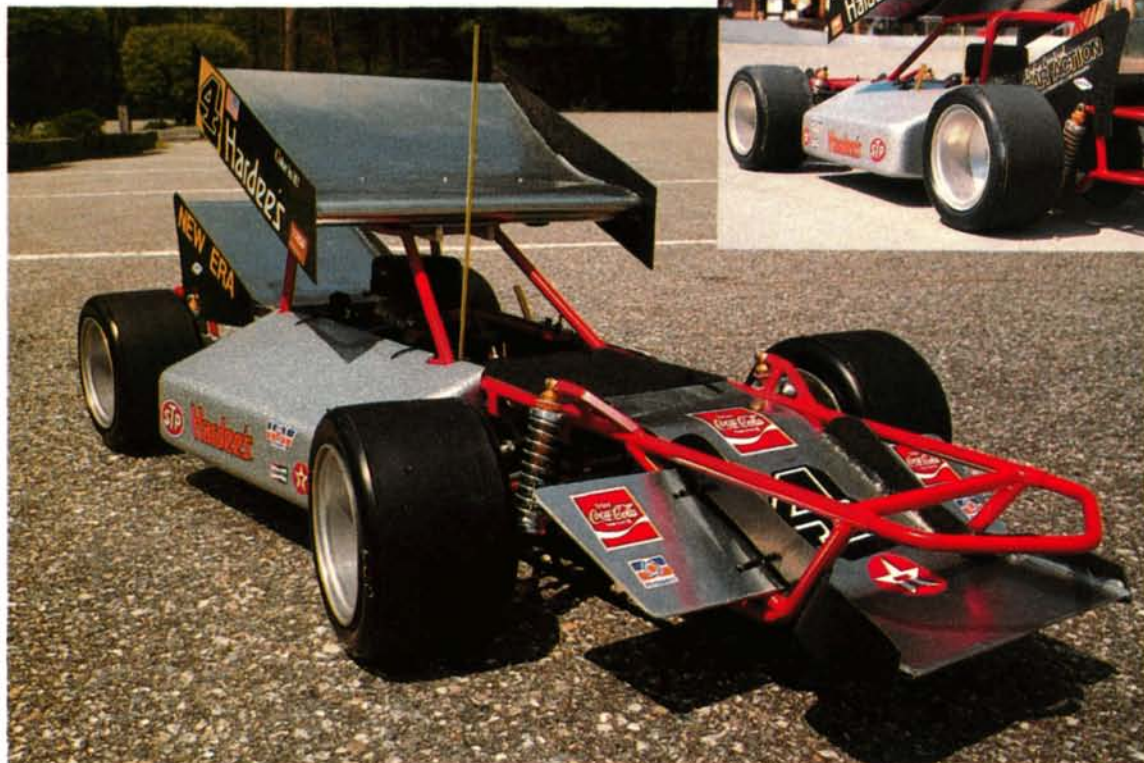
formance and wheel-spinning takeoffs, I bolted a Dymond* sprint motor into place by the rear axle and added a set of 6:1 gears.

After determining that everything fit neatly under the body, the Lexan shell was prepped for painting and the grill and windows were masked. I used Chrysler Hemi Orange paint, and, for a different look, I used Plymouth's Sassy Grass Green for the flames. Chromed foil bars applied to the grill created a realistic

see-through look. The completed body was mounted to the chassis with the included no-show Velcro mounts a straight pin on each side of the lower portion of the body.

As a finishing touch, a set of radius rods was made out of K&S* aluminum tubing, formed to fit, and then polished as before. A set of headlights from the aforementioned plastic kit mounted easily to the

(Continued on page 132)



The rear end of the Supermodified is protected from race damage by a solid, dual-nerf-bar setup.

by RICH HEMSTREET

NEW ERA EAST COAST SUPERMODIFIED

SHORT-TRACK OVAL racing is often very rough: Sheet metal is bent, and tire rubber is left on the track and on the sides of the competition. The shorter the track, the tighter the oval, and

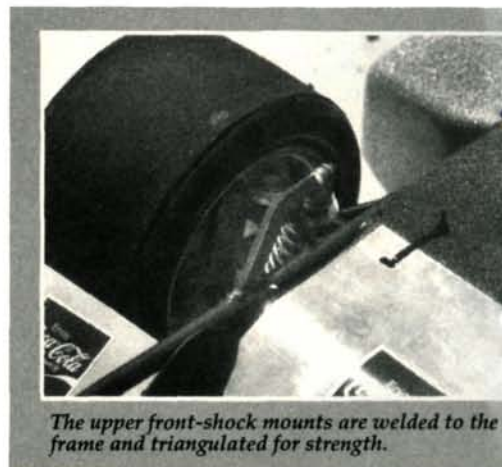
this makes handling more important than horsepower. If your car has a tendency to oversteer, a tap on the rear end when entering a turn will send you spinning out. If your car pushes, drivers will go deeper

into the turns all around you, and they'll pass on the inside as your car slides out wide.

Since most 1/4-scale racing takes place on very short ovals, good handling is essential. New Era's* East Coast Supermodified is built for short-track racing. The tube

frame is very strong with excellent bracing and triangulation throughout. Fiberglass side pods are hung between the wheels, and aluminum body panels with Kydex side pieces are used for the nose piece, top wing and tail section.

New Era uses a simple A-arm front suspension system, and oil-filled coil-over



The upper front-shock mounts are welded to the frame and triangulated for strength.

shocks are used on both sides for weight-jacking and dampening. At the rear, the solid axle is held in place by four adjustable radius arms. A panhard bar maintains the lateral location of the rear axle, and oil-filled coil-overs are also used at the



UGLY, LOUD AND AGILE



With Race Craft tires, New Era's East Coast Supermodified handles well without a top wing.

rear. The right front spring is much stiffer than the other springs, and this makes it easier to tune the Supermodified without limiting the right front suspension travel.

Since the New Era car is 75-percent pre-built, all you have to do is mount the radio system (including the throttle and brake linkage), install the body and the gas tank, assemble the wheels and mount the tires. Sanding and painting aren't necessary.

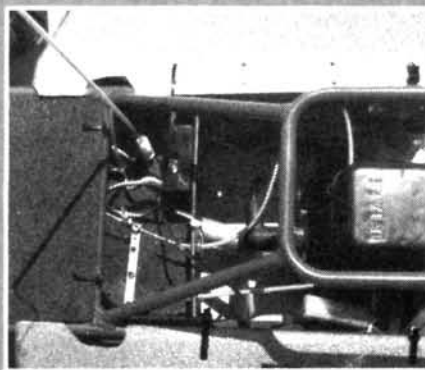
For safety reasons, I chose a new Futaba* Magnum transmitter, because it

decided to see if a large Kimbrough* $1/10$ -to- $1/8$ -scale servo saver would give me sufficient steering throw. Surprise! Kimbrough's servo saver also works for $1/4$ -scale cars. I don't know how well it will hold up, but I'd rather replace servo savers than servos.

The throttle servo mounts in a Kydex box in front of the Zenoah* engine. Cables are used to connect the throttle and the brake to the servo. With this system, it's very difficult to get the throttle to work smoothly over its full throw, and I'm sure



Adjustable radius arms hold the rear axle in place while providing plenty of suspension travel.



It was difficult to get enough throw on the throttle cable for full throttle.

put out a stronger signal than most cheaper radios. I also installed a Futaba receiver and two Futaba S-134 servos. Only a solid servo arm was called for, and no servo saver was required on the steering servo. This didn't seem wise, so I

there must be a better way to set up the throttle.

The Zenoah engine and drive train are pre-assembled. A short belt goes from the crankshaft to the clutch and, from the

(Continued on page 135)

NEW ERA

EAST COAST SUPERMODIFIED

Type On-road oval racer
Scale $1/4$
Sug. Retail Price \$1,095, 75% pre-assembled; \$995, 25% pre-assembled

DIMENSIONS:

Overall Length 40 inches
Width 18 inches
Height 9.5 (roll cage) or 16 inches (wing)
Wheelbase 21.75 inches
Front Track 14.50 inches
Rear Track 13.75 inches

WEIGHT:

Gross 24.5 pounds

BODY:

Type Open-wheel supermod
Material Fiberglass, aluminum and Kydex

CHASSIS:

Type Tube space frame
Material Steel

DRIVE TRAIN:

Type (pri./sec.) Belt/chain
Differential None
Bearings/bushings Ball bearings

SUSPENSION:

Front: Type A-arms
Dampening Oil-filled, coil-over shocks
Rear: Type Radius rods, panhard bar
Dampening Oil-filled, coil-over shocks

WHEELS:

Type (f/r) Steel two-piece
Dimensions (DxW) (f/r) 3.75x3.25 inches

TIRES:

Front Race Craft GN500
Rear Race Craft GN300

ELECTRICS:

Engine Zenoah
Starter Recoil

OPTIONS AS TESTED:

Futaba Magnum, with two S-134 servos.

COMMENTS:

The Supermodified came 75-percent pre-assembled, so only the radio equipment, throttle/brake linkages and body had to be installed. This is the best-handling $1/4$ -scale car I've driven. The suspension system has lots of adjustment points built in, but the throttle cable system needs to be improved for better control.

SCOPING OUT

by JOHN RIST

Kyosho's SC-1000: Can it deliver?

IT'S CROWDED at the top!—at least, there are many top-notch speed controllers in the 7- to 8-FET class. Typically, these speed controllers will have 6 FETs in parallel to yield a very low forward “on” resistance, and the remaining one or two FETs will provide the brakes. Another contender for space at the top among these speed controllers is Kyosho's* SUPER-SPEED 1000, which has these features:

- Smallness
- Racing style, forward-only with brakes
- Neutral, high-point and response adjustments
- High-point indicator lamp built in
- Adjustment screwdriver and instruction sheet

The one noticeable difference between this one and the other controllers is that it has a full set of connectors attached. A serious race car driver wouldn't use stock connectors, but not everyone can solder well enough to change the connector system.

The SUPER-SPEED 1000 is a good choice for Kyosho car owners who want to get rid of the old three-step mechanical speed controller but aren't quite up to soldering together a custom connector system. If you plan to run this controller in a non-Kyosho car, or if you plan to remove and replace the stock connectors, you'll encounter a couple of problems.

The first hitch is the battery-connector's polarity. The controller comes with the standard bullet-style motor connectors, and at first glance, it seemed to have a Tamiya-style battery connector. A close inspection revealed that the battery plug is male instead of female, as it would be for the Tamiya. It seems that Kyosho and Tamiya have adopted different standards for polarizing the battery connector, so if you have a Kyosho battery-connector arrangement on your car, the SUPER-SPEED 1000 will plug directly in. If you have some other connector, make sure that your local hobby shop can help you attach the right connector for your car.

The second difficulty is that the control-

ler leads aren't color coded to distinguish between battery input and motor output (the motor lead should be blue, not black). I don't run the stock connectors, because the voltage loss through the long wires and the stock connectors can easily equal or exceed the voltage loss of the FETs and the internal solder joints. My Turbo Ultima has no motor connector (the motor is soldered in using monster wire), and the battery is connected with a Sermos silver-plated connector. If you cut off the motor and the battery connectors at the same time, you'll be faced with two red wires and two black wires, but which is which? The two red wires are interchangeable, but if you swap the black wires between battery and motor you'll destroy the controller. To avoid this disaster, I tag the motor wire with a piece of blue decal material, and I replace the battery connector *before* I cut off the motor connector.

So if you have a Kyosho car or truck, the SUPER-SPEED 1000 is ready to plug in; if you have some other type of car, or you plan to change connector types, be careful not to swap the black motor lead and the black battery lead.

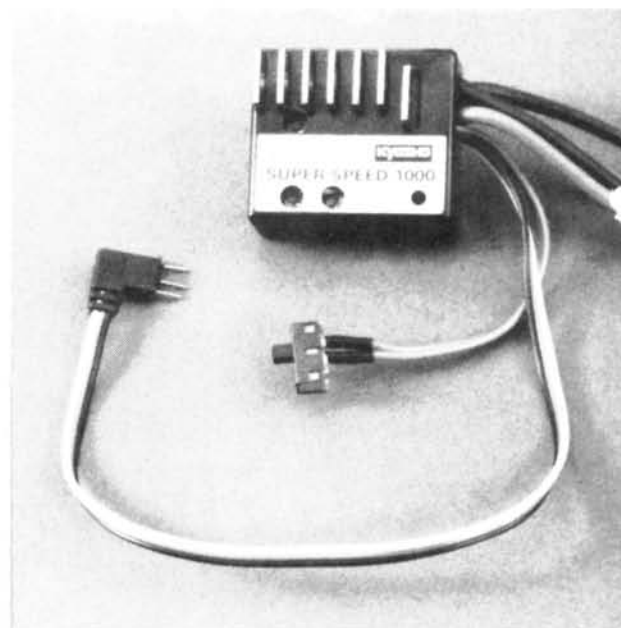
The remaining connector is the receiver connector.

The SUPER-SPEED 1000 comes with the receiver connector of your choice to fit all the popular radios. Consult your radio manual, and make sure that you choose the proper receiver connector. The speed controller I tested had the Universal-style Futaba J receiver connector, so the receiver connector will plug in backwards. You should therefore plug in the steering servo first and match the color of the wires on the SUPER-SPEED 1000 as you plug it in.

So far, I've told you nothing that you

couldn't learn just by looking at the controller through the window of a hobby shop. Now I'll investigate the manufacturer's claims of outstanding performances by running the SUPER-SPEED 1000 in the lab.

My standard lab setup consists of an oscilloscope, a digital voltmeter, a resistor load bank, and a 6V 30-amp lab supply. The oscilloscope is used to monitor the controller's output and verify that it's fully on. The digital voltmeter is used to take all the voltage-drop readings and the

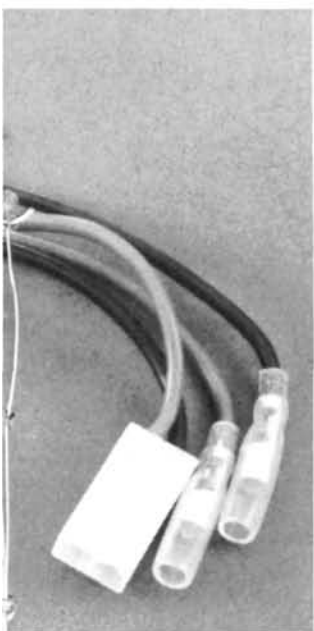


current meter's reading. The resistor load bank is a bank of 40, 12ohm, 5-watt power resistors, which can be switched on and off one at a time to vary the load between .6 amps and 20 amps. In series with the resistors is a 25-amp Simpson current meter and a 1-percent .01ohm resistor. By measuring the voltage drop across this resistor, the current-meter reading can be double-checked. Of course, the test current is the lab's regular supply.

SET-UP: The initial set-up of the speed controller was quite straightforward, even though the instruction sheet was skimpy but still useable. The wording in the in-

structions is a little strange because it has been translated from Japanese. The picture showing the connection of the SUPER-SPEED 1000 to the battery, motor and receiver is excellent and should permit even the first-time car builder to install the unit without trouble.

The only mystery I found when setting up the



controller was the performance of the response control: It's *supposed* to provide a range of trigger responses. In its broken English, the instruction sheet says, "With the response control, you can adjust the sensibility of the response as you like," but I couldn't see *any* difference in the trigger response when I changed the setting of this control. With the oscilloscope, I made some precise measurements of the controller's reactions to the full swing of the response control and, to make a long story short, I just couldn't see any significant change. The response control seems to modify the rise time of the FET con-

TEST DATA

SUPER-SPEED 1000

DIMENSIONS:

Height	.75 inches
Width	1.31 inches
Length	1.5 inches
Weight	40 grams
Access to Controls	Good
Ease of Adjustment	Fair
Warranty	None stated

ELECTRICAL:

(Manufacturer's Specs)

Max Voltage	9.6V
Min Voltage	6.0V
Max Current Forward	1260 amps
Continuous Current	210 amps
Resistance	.004 ohms

TEST PARAMETERS:

Voltage	6V
Current	12 amps
Voltage Drop with Connectors	.29V
Resistance with Connectors	.024 ohms
Voltage Drop, 2-inch Wire	.09V
Resistance, 2-inch Wire	.007 ohms
Sug. Retail Price	\$199.95

COMMENTS:

Kyosho's top-of-the-line electronic speed control is available with receiver connectors to fit all popular radios. This unit's only drawbacks were the use of small-diameter wires for the battery and motor leads, and the negative input and output wires were both color-coded black. When used with shortened 2-inch wires, the voltage drop is greatly reduced. Kyosho's SC-1000 is a competitive controller.

trol signal. At best, the feature is a wash-out, so set the response control to the full counterclockwise position and forget it.

Because the SUPER-SPEED 1000 comes with motor/battery connectors installed, but the controller is of the forward-only-with-brake racing type, I decided to run two different test setups. The first setup measured the voltage drop from input battery connector to output motor connector in the original configuration as supplied by Kyosho. In the second setup, I removed the original connectors and all except 2 inches of the battery and motor wires. The 2-inch lead is the length re-

quired to hard-wire (solder) a speed controller into my Turbo Ultima. The measured voltage drop with the full-length wires and stock connectors in place was .29 volts at 12 amps. The same measurement with 2-inch wire and no connectors was .09 volts at 12 amps. Both readings are higher than the ones specified by Kyosho: .048 volts at 12 amps ($0.004 \text{ volts/amp} \times 12 \text{ amps} = .048 \text{ volts}$). This is understandable, because all speed-controller manufacturers list only the voltage drop caused by the FETs located in the controller. Typically, the best available high-grade FET will have a resistance of .028ohms. Six in parallel would give you .0046ohms, which is very close to Kyosho's claim of .004ohms for the SUPER-SPEED 1000. With the FETs now available, you're unlikely to see values lower than .0046ohms for six FETs in parallel. My point is that the connectors and long wires amount to 68 percent of the resistances of this speed controller.

The next test was letting it cook! I let the controller pump 12 amps for 30 minutes without the benefit of cooling air. The heat buildup in the controller was moderate (it was quite warm, but not hot). If you're careful to ensure that the controller gets plenty of cool air, there shouldn't be any overheating problems.

My final test is always the short-circuit test, which entails jamming a screwdriver across the output while the controller is fully *on*. The SUPER-SPEED 1000 doesn't come with a fuse, and Kyosho doesn't recommend that you install one. With this type of setup, things get *very* hot when you apply a dead short. The SUPER-SPEED 1000 did get extremely hot; in fact, I was worried about burning the wiring. After cooling, the controller's operation seemed unaffected. I'm not implying that the SUPER-SPEED 1000 can stand a short indefinitely, but it seems to be tough enough to survive jammed gears and shorted motors if you don't insist on holding the trigger down until smoke pours out.

(Continued on page 142)



QUARTER-SCALE'S ONLY INDY CAR

by RICH HEMSTREET

RACE-TECH

DEFIANT



LOLA, MARCH AND Race-tech* all build Indy cars that are available on the open market. A Lola or March chassis only costs about \$200,000, but when you add a \$100,000 Chevy or Cosworth engine, the bill goes up to \$300,000. Of course, that doesn't include any wheels or tires, but you get the idea.

For less than a quarter of that price (\$75,000), you could field a full 33-car starting grid of Race-tech Defiant 1/4-scale Indy cars and have change left over. At \$1,695, Race-tech's car is not only the most complete Indy car on the market, regardless of scale, but it's also

the only 1/4-scale Indy car now available.

The Defiant comes completely built; you only have to install a 2-channel radio and paint the fiberglass body. The onboard radio system requires a large 1/4-scale steering servo, a standard-size servo for the throttle and brake and a 2-channel receiver. This radio system is powered by a 6-cell sub-C battery pack.

For this track report, Race-tech sent me a ready-to-run car that was painted in Bobby Rahal's blue-and-yellow Kraco colors. The Airtronics* receiver was connected to a 94635 Airtronics throttle servo and a

Futaba* S-134 steering servo.

Up front, the Defiant uses independent upper and lower A-arms, with oil-filled coil-over shocks. An independent three-link system is used on the rear end. The leading link on each side is non-adjustable and very strong; the two rear links on each side are adjustable and provide camber and toe adjustments. The adjustable oil-filled coil-over rear shocks attach to the leading links.

Race-tech builds the Defiant's frame with a combination of square and round tubing. The Zenoah* engine is attached directly to the quick-change gearbox. (No chains or belts are used.) The gearbox has a locked rear end, so there's no differential. The Zenoah even has a tuned expansion chamber for the exhaust system.

With the throttle servo mounted next to the carburetor, there's no need for a complex linkage system. Likewise, this servo is also very close to the rear disc-brake setup. (That's how Race-tech gets away with using a standard-size servo for the throttle and brakes.)

A remote quick-fill fuel inlet is located directly behind the cock-



pit on the left side of the car, and it's connected to a regulation 8-ounce gas tank. The fiberglass body shell is a two-piece affair that's held securely to the chassis with Velcro-style material. A separate molded cockpit interior fits between the top frame rails.

After watching Emmo and Little Al go at it in the 500, I was excited to get the Defiant on the track. Whenever you run a 1/4-scale car, you must make sure that the radio system and brakes are working properly before you fire-up the engine. The Defiant's radio switch is very difficult to reach with the body in place, so I turned on the transmitter and then the receiver before putting the body on. To make it easier for the steering servo to center itself without straining, lift the front tires off the ground before turning on the onboard radio system. Next, check the throttle and brakes by rolling the car forward and applying the brakes. If the car doesn't stop, *don't* start the engine!

The Defiant's brakes worked, but not very well. A little adjusting helped, but they still weren't great. I really needed to remove the brake-control arm and rotate it 90 degrees from the direction of the brake rod, and while this wouldn't be all that difficult to do, I didn't do it. If I were going to race this car competi-

Without its bodywork, Race-tech's Defiant Indy car isn't a Concours candidate, but the car should be easy to work on and it's quite durable.



RACE-TECH

DEFIANT

Type Indy car
Scale 1/4
Sug. Retail Price \$1,695

DIMENSIONS:

Overall Length 44.5 inches
Width 20.3 inches
Height 10 inches
Wheelbase 25.125 inches
Front Track 14.875 inches
Rear Track 17 inches

WEIGHT:

Gross (w/bat.) 26 pounds

BODY:

Type Indy car
Material Fiberglass

CHASSIS:

Type Tube space frame
Material Steel

DRIVE TRAIN:

Type Geared
Differential None
Bearings/bushings Ball bearings

SUSPENSION:

Front: Type A-arms
Dampening Oil-filled, coil-over shocks
Rear: Type Independent three-link
Dampening Oil-filled, coil-over shocks

WHEELS:

Type (f/r) Steel two-piece
Dimensions (DxW) (f/r) 3.75x3.25 inches

TIRES:

Front/rear Race Craft

ELECTRICS:

Engine Zenoah
Starter Recoil

OPTIONS AS TESTED:

Airtronics receiver and throttle servo,
Futaba S-134 steering servo

COMMENTS:

Race-tech's 1/4-scale Indy car is the first one on the market, and it comes pre-built. The chassis could use some strengthening behind the rollbar, where the engine sits. The fully independent suspension is strong and provides sufficient adjustments to get the car dialed-in.

tively, however, I would definitely take the time to improve the brakes.

The Defiant doesn't have a choke on its carburetor, but I didn't miss it, because the engine quickly fired up. With the body mounted, it's easy to start the car. With the transmitter and receiver turned on and the car in your left hand, you must lift the left side of the car off the track at a 45-degree angle and pull the starter with your right hand. If the car is being fired-up for the first time that day, check that the primer bulb on the carburetor is filled with gas. If it isn't, push it a couple of times and it will be.

PERFORMANCE: When the engine had warmed up a little, I was ready to take a few shakedown laps. The Defiant was easy to drive at slow speed; it tracked straight and true, but I never went over half throttle. I pulled the car in for a

quick check: The Race Craft* tires hadn't even started to warm up. It was time to do some hot laps!

At three-quarters to full throttle, the car really changed: Oversteer became a real



The tuned exhaust pipe is included with the almost-ready-to-run Indy car. It's well-protected by the built-in nerf bar.

A NEW FACE BEHIND THE WHEEL OF THE KRACO MACHINE

Bobby Rahal is at the wheel of the Kraco Lola during the Indy 500.



PHOTO BY STEVE POND

by WALLY DAVID

THE BLUE AND YELLOW colors of the Kraco Lola Indy Car have been a favorite with racing fans for many years, but this year, the man behind the wheel won't be the one who has long been associated with the car.

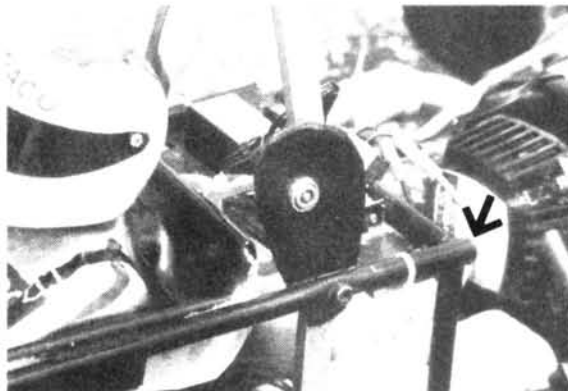
Two-time CART champ and 1986 Indianapolis 500 winner, Bobby Rahal, of Dublin, OH, is now the driver of the Kraco Lola. This year, Rahal switched from the Judd-powered Truesports Lola to replace Michael Andretti in the Cosworth-powered car.

Unfortunately, the season hasn't turned out quite the way Rahal had planned, as the Cosworth engine lacks the power to keep up with the Chevrolets and the rapidly improving Porsche engine.

While the Chevys probably won't be available to more than a few select teams, there are rumors that next year, Porsche, Judd and Alpha Romeo may be looking for teams with whom they can place their engines. For Bobby's sake, let's hope he gets one!



Inboard, oil-filled, coil-over shocks are used on the Defiant's front suspension.



The quick-fill fuel inlet is attached to the rollover bar. Notice where the roll cage ends (arrow); it doesn't go to the rear of the chassis.

problem, and I had to back off the throttle and coast through the turns. The car also became difficult to control at high speed and tried to spin out while going straight. When I could keep it going straight long enough, the car picked up enough speed to make the rear wing work, and this helped neutralize oversteer on entering the turns.

This initial test session showed that the Defiant is very well-built. I launched the car over a curb and hit the curb with the nose cone and right, front wing and tire. The car landed in the weeds, but nothing broke. Only the front wing's aluminum side plate had to be bent back into position. Later, I slid sideways into another curb; both left tires hit the curb simultaneously, but without causing any damage.

After a few more laps, I brought the car in and checked the tires. The rears were warm and tacky across their full width, but only the inside half of each front tire had warmed up. Back home, I noticed that both rear tires were toed-out several degrees. I readjusted the rear suspension so that there was approximately 1 degree of toe-in, and I also softened the rear coil-spring preset. Up front, I increased the spring tensions on both sides, because I wanted to get rid of the oversteer. While the front wing could be adjusted by shim-ming, it was already in a neutral position that didn't cause any handling problems.

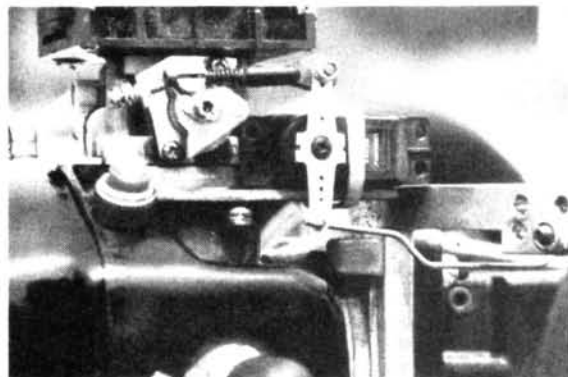
With these adjustments made, I tested the Defiant again, and handling was much better. At high speed, the car was solid and went as straight as an arrow. The oversteer was almost entirely gone and the cornering speeds were quite a bit higher. Tight turns still caused oversteer, but wide

turns weren't a problem.

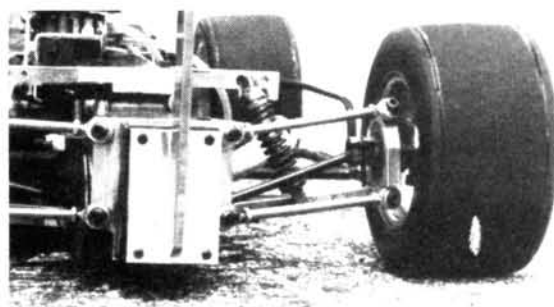
When I pulled the car off the track, all four tires were warm across their full width; obviously, I was in the ballpark. Playing with the right front and left rear weight-jacking would probably have helped me get the car dialed-in even more.

During my second test session, I threw a left dogbone off the car. This probably happened because I'd moved the rear hub out to get the rear toe-in I wanted, but it gave the dogbone enough room to escape. A spring inside one or both dogbone cups would probably prevent this.

The rear suspension travel is limited by the steep angle of the dogbones. The gearbox output cups are far below the wheel-hub cups. While this keeps the center of gravity very low, longer rear shocks would produce a more efficient setup and reduce the angle of the dogbones by 50 percent. The Defiant exhibits no tendency to roll over at present, so slightly raising the height of the gearbox shouldn't create any problems. A different style of rear wing would also help, along with a better mounting system. The wing supplied with the car is a copy of those used on the fastest full-scale tracks. A multiple-element wing, similar to the ones CART racers use on short ovals and roadcourses, should work



Race-tech avoids linkage problems by placing the throttle/brake servo directly next to the carburetor. This system is also nice because it works with a standard-size servo.



Notice the extreme angle on the dogbones going from the gearbox to the rear hubs: They restrict suspension travel in this position.

at lower speeds. I don't think the wing should be held on by Velcro as it is in the production models, because more wings will probably fall off during racing contact than will be "saved" from major damage in a roll-over. I'd like to see a solid wing mount that also offers some angle-of-attack adjustability.

(Continued on page 144)



One truck makes it through, as at least three others tangle in mid-air.



S P E E D

WEST COAST TRUCK CHAMPIONSHIP

by RICK HOULE

SPONSORED BY TEAM Losi and JG Mfg., the Western Truck Championships are the "gnarliest" R/C truck race of the century! If you've ever wondered what it would be like to see over 200 R/C trucks battling it out in nine classes (all under one roof), you only had to be at the Radio Control Race Cars of Riverside (RCRCR) raceway in Southern California for the second annual running of the Truck Champs! RCRCR is the birthplace of modified monster truck

racing, and the first Truck Champs were held here last year, so this was the perfect venue for this year's race.

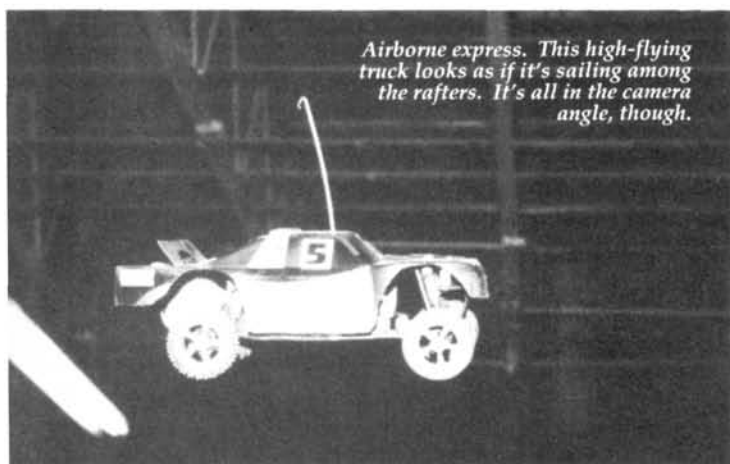
The event yielded many innovative and radical examples of R/C truck engineering, e.g., the introduction of 4WD open monster trucks and truck bodies mounted so low on their chassis that shocks, shock towers and other chassis parts protruded through hoods and rear decks! Team Losi's Ron Rossetti

was trying out a quad-shock arrangement on the rear suspension of his JR-X2 monster truck; and Eustice Moore Jr.—Mr. MIP himself—has great luck with his MIP converted RC10 modified monster truck.

If there had been an "Ironman" trophy, it would have gone to Kyle Reed, who won three of the coveted hatpins that NORRCA awards to the top qualifier in each class. Reed posted the fastest lap times in the 2WD Open, the 2WD Stock and the 4WD Open Monster Truck Classes during qualifying. RCRCR is Reed's home track (Kyle's father, Warren Reed is RCRCR's proprietor), but he's usually a front-runner at every major event in which he competes—at any track.

Team Losi's new monster-truck star, Jack Johnson, blew the doors off everyone in the Open Monster Truck Class by taking the TQ hatpin. Robinson Racing Products' owner Rob Robinson did the same in the Super Stock Truck Class, as did Jeremy Hase in the Novice Class. Stock Truck TQ went to David Wilson, and Tom Clark earned the pins in both 4WD Stock and 4WD Open.

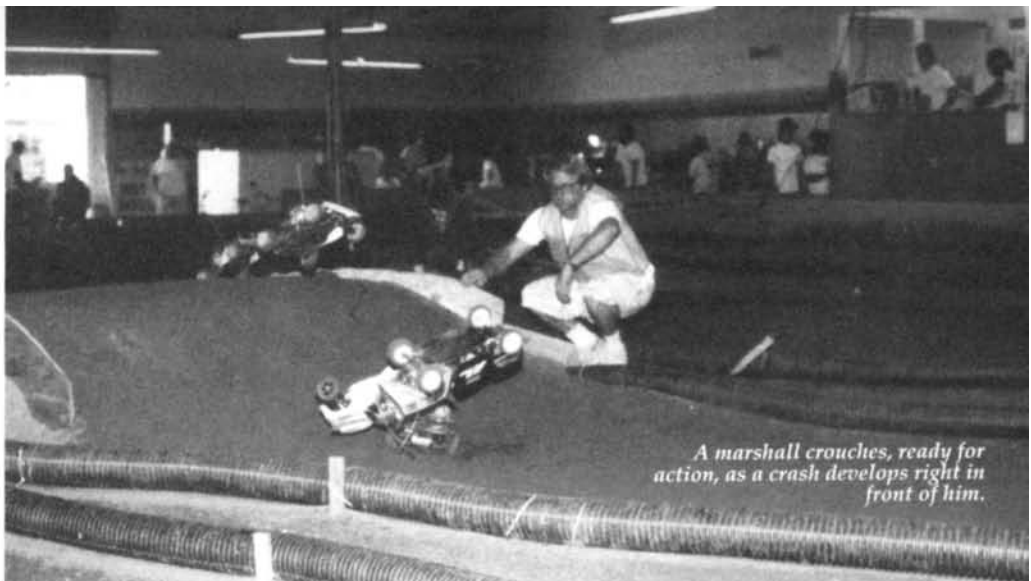
Three racers earned top honors in Concours for their beautifully detailed rides. Bob Kaufman won 1st place and his partner Biff Baschion took 2nd—both with Chevy Blazer Parma bodies painted by Biff. Roger Tibbets won 3rd for his nicely done Toyota body from McAllister.



Airborne express. This high-flying truck looks as if it's sailing among the rafters. It's all in the camera angle, though.



The chopped-down No. 3 truck kicks up dirt after making a hard landing.



A marshall crouches, ready for action, as a crash develops right in front of him.

M E T A L

As Tom Jones from Sound Cycle R/C shop will confirm, some racers traveled far to attend this event. Jones, who lives in Port Orchard, WA, drove down to California to enjoy a week's worth of kick-back R/C racing, and competing really paid off for him.

- **2WD OPEN:** Of 24 entrants, only three drivers completed 13 laps in qualifying for the 2WD Open Class! Kyle Reed turned in the TQ time of 13/4:08.91, giving him a decisive margin over Joe Schmitz (13/4:18.14) and Race Prep's Mike Dunn (13/4:18.92). It was Dunn, however, who had all the dials set correctly for the A-Main and who took the lead from Reed early on and didn't let go! Dunn in the lead, Jack Johnson in 2nd and Reed in 3rd "freight-trained" in these positions for most of the race, and that's how they finished.

- **OPEN MONSTER TRUCKS:** Two of last year's biggest stars, who run for JG Mfg., were conspicuously absent from this year's race. Since Brandy Dreifus and Gary Guest weren't there, more than 40 monster mashers were left to duke it out for this year's title of the "baddest" in the class! Every driver in the A-Main qualified with 12 laps, but Jack Johnson posted the TQ run of 12/4:03.48. Usually producing the roughest racing, the Open Monster Truck A-Main proved to be the cleanest race of the day! Johnson pulled off a



Just a little more flight angle, and this RC10 is going over backwards!

well-deserved win with Joe Schmitz in 2nd and Peak Performance's Derek Furutani in 3rd.

- **4WD OPEN:** Tom Clark was the favorite to win after he had put his car on the pole with a TQ run of 13/4:15.78, but going into the Mains, Mike Dunn had different plans for him. Piloting his AYK Radiant, Mike snatched the A-Main 1st-place trophy just ahead of Clark in 2nd and A&L's Dominic Sellers in 3rd.

- **SUPER STOCK TRUCK:** Richard Jamieson took the point position early in the A-Main and threatened to win this one! Rob Robinson dogged Jamieson un-

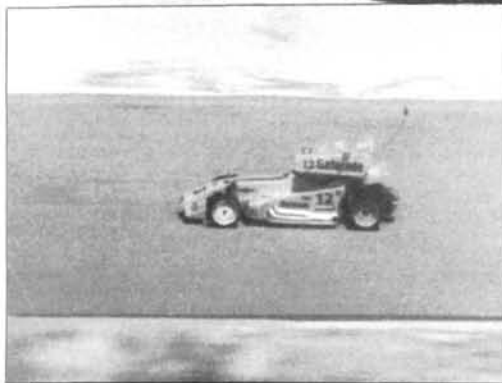
til the leader stuffed it into a corner at about the halfway mark and Robinson took over. The two leaders traded lots of Lexan off each other's trucks as they battled for position. At the finish line, however, it was Robinson taking the win with Jamieson in 2nd and JG's John "Hammer" Smith in 3rd.

- **STOCK TRUCK:** The Blackfoots and Big Brutes had their day at the Champs along with everything else. David Wilson put his truck on the pole with his TQ run of 10/4:05.74. Wilson led the A-Main for a few laps until trouble with back-marker

(Continued on page 148)

RCRC SUPER MOD

CONVERT ALERT



by WALLY DAVID

WHEN YOU HEAR the term "modified" in relation to R/C car racing, you probably think of a class of racing motors, but it can also mean that racers have made changes to their cars' appearance or performance, or both.

When you hear the term "supermodified," it can only mean one thing: Supermodifieds (or "supermods") are a type of open-wheel car that combines the large wing and exposed roll cage of a sprint car with the sleek, low-slung body style that resembles that of an Indy car (including a low nose wing). The engine, thus, much of the car's weight, is offset to the left of the car, and this makes the car turn to the left ex-

The RCRC Super Modified in full dress (with MRP body and wing) looks quite impressive. The molded exhaust and fuel-filler decal add realism.

tremely well, and that's the only thing supermods do!

On the heels of its sprint-car conversion kits, Radio Control Race Center*, of Gardena, CA, has come up with a supermod conversion kit for the RC10. The kit includes a 6mm aluminum roll cage, an aluminum rear nerf bar, a narrow fiberglass chassis and hardware. To complete this conversion, you'll need an RC10 and an MRP* Super Modified body, No. 1136.

THE KIT: Everything was there, except one thing—instructions! If you've read any of my previous articles in *Car Action*, you'll have noticed that I'm a stickler for instructions. When I have a complaint, it's usually that the instructions are badly written or poorly illustrated. Well, in this case, there's no way I could complain about either. The only guide included was one sheet on which there was a *small* picture of the car and a diagram showing the pre-drilled holes in the chassis. There's also a note instructing the builder to drill two *new* holes ¹¹/₁₆ inch forward of the *existing* holes in the middle of the chassis, but the holes have already been drilled!!? Apart from these little tidbits, you're left to your own devices and, fortunately, it isn't

a complicated process, though it might give an inexperienced builder some trouble.

The rear nerf bar confused me: It looks as if it doesn't really belong to this kit. The bar is on the list of contents, but it isn't shown in the little picture. Its shape is identical to the ones found on sprint cars, but unlike the squared-off ones found on supermods. I chose not to use it, but it wouldn't be very difficult to make a properly shaped rear nerf/push bar if you wanted to.

CONVERSION: First, fit the roll cage to the chassis by matching the bottom of the cage to the holes in the chassis. The cage in my kit required some bending and shaping to get everything to line up. I also had to cut about 1/4 inch off one leg of the cage to make it sit flat on the chassis. *Don't* actually attach the cage to the chassis at this time.

Next, polish the roll cage by rubbing a piece of emery cloth *against* the grain of the aluminum. This will eventually bring you down to the unblemished part of the aluminum. It's easier to concentrate on the little dings and imperfections in the aluminum if you attack only a small area at a time. Be prepared to spend some time on this part; it's tedious work, but the results are worth the effort. When you've worked the cage over with the emery cloth, take a Scotch Brite pad (a plastic scrub pad available at any grocery store) and rub the cage, this time going *with* the grain. This should give you an idea of the progress made with the emery cloth.

When you've gone over the entire cage and nerf bar, it's time to polish the aluminum for that shiny chrome finish. I used Mother's Aluminum Polish, which is usually available at automotive supply stores. Put a small amount on a clean, soft rag and buff a small area of the cage, going *with* the grain of the



A front view of the Super Modified shows the tie rods that replace the front shocks. The low-profile tires get the car close to the track. If the front wings look a little bent, it's because they are! The photographs should have been taken before the test run.

aluminum. If you've done enough work with the emery cloth and the Scotch Brite, the aluminum will come up shiny. You'll be able to see any spots that you missed, so keep up the three-step procedure until you're satisfied with the finish. It's most important to concentrate on polishing from the top of the cage down to the shock-mount ears, because that's what will be visible when the body is on the car.



Here you can see the aluminum roll cage that has a polished finish. Space is quite tight, so the receiver and speed control are mounted on a JG Manufacturing Universal Receiver/Speed Control Mount with a piece of Lexan for an extender.

Now it's time to put the car together. Remove the front end from your existing RC10. Since the chassis has no nose plate, you'll need the one from your car. It isn't necessary to completely disassemble the front end; just remove the nose plate, with the suspension components still attached to it. If you use the stock aluminum one, it will bend back on impact, as there's no way to attach the nose-brace tubes to the new chassis. A better idea is to use a graphite nose plate from Composite

(Continued on page 94)

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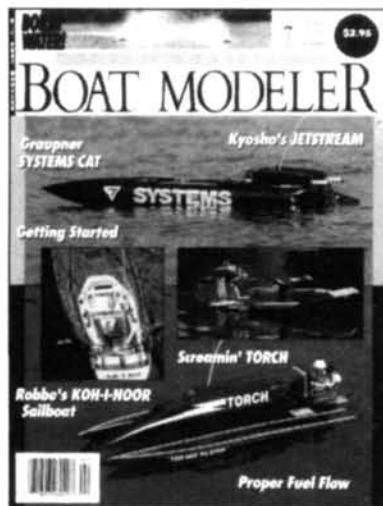
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RCRC SUPER MOD

(Continued from page 93)

Craft*. Because of the strength of the graphite, this one won't bend on impact.

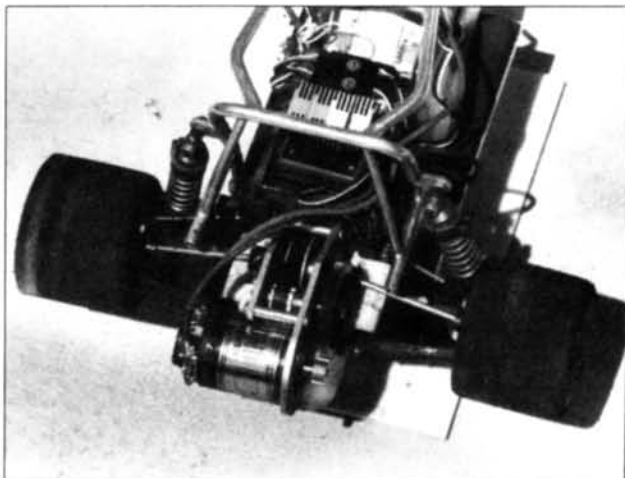
Whichever nose piece you choose, bolt it to the chassis using the stock screws. There's a choice of three different locations for these screws, and I can only assume this is for different lengths. I chose the holes closest to the front of the chassis to give the longest wheelbase and, therefore, the most stable handling. In the pictures, you'll see that there are no

sis, using the correct holes. The short shocks are attached to the ear-like shock mounts on the rear of the roll cage. Use the same spacing as you'd use on the stock shock mounts.

While the stock gearbox works fine on the Super Mod, I decided to try Track Master's* Belt Drive Transmission. This tranny is extremely smooth and simple. A belt runs from the differential/sprocket assembly to an upper sprocket. The spur gear is bolted to the upper sprocket shaft,

which turns the upper sprocket, thus turning the belt and the differential/sprocket assembly. Held on by set-screws, output cups turn the dogbones, and so on. Because of the belt system, there are no gears to wear out.

On the rear of the car, I used AJ's* 2-inch BBS wheels, which I mounted with Track Master wheel adapters. To meet ROAR's 9 7/8-inch maximum-width rule, these wheels will have to



You can see the Dymond Gold Series Motor bolted to the the Track Master Belt Drive Transmission. This made for a very smooth power combo! Notice that the short shocks are attached to the roll cage.

shocks on the front of my car. The tie rods provide a rigid front end, which works well on carpet or asphalt. (This is discussed in my article, "On-Road RC10" in the March '89 issue of *Car Action*.) If you don't like this idea, you'll have to get a second set of front shocks, as long shocks won't fit on the back of the car.

If you've spent any time racing an RC10, you've probably had a front axle and wheel come off during a race. Well, Associated* has come up with a way to stop this from happening. Its new In-Line Steering Block and Axle eliminate the use of an E-clip to retain the axle. Now, the kingpin holds the axle in the steering block. It's very encouraging to see a manufacturer come up with an effective product improvement, instead of waiting for an after-market company to do it.

With the front end finished, we'll move on to the rear end. Remove the rear end from your stock RC10. You won't need the shock mounts, so put them away. Install the entire rear end on the new chas-

sis, using the correct holes. The short shocks are attached to the ear-like shock mounts on the rear of the roll cage. Use the same spacing as you'd use on the stock shock mounts.

While the stock gearbox works fine on the Super Mod, I decided to try Track Master's* Belt Drive Transmission. This tranny is extremely smooth and simple. A belt runs from the differential/sprocket assembly to an upper sprocket. The spur gear is bolted to the upper sprocket shaft,

which turns the upper sprocket, thus turning the belt and the differential/sprocket assembly. Held on by set-screws, output cups turn the dogbones, and so on. Because of the belt system, there are no gears to wear out. On the rear of the car, I used AJ's* 2-inch BBS wheels, which I mounted with Track Master wheel adapters. To meet ROAR's 9 7/8-inch maximum-width rule, these wheels will have to be reversed and the rear hub carriers will have to be modified. (For details, see the "Homemade Chassis" article in the April '89 issue of *Car Action*.)

The finishing touch for the RCRC Super Modified kit is the MRP* body and wing; it's a nice representation of a supermodified racer.

Bill Henning, of Henning Scale Models in Lansdale, PA, created the Gatorade Special, and the Gatorade stickers are new from Parma*. The yellow-and-orange paint job is finished with stickers from various manufacturers. (If you've painted a number of bodies, you know how that pile of stickers seems to grow! I have so many bits and pieces of sticker sheets, that it's difficult to know which sticker came off which sheet!) The giant wing is bolted to the top of the roll cage.

With the body complete and a new Dymond* Gold Label Racing Motor bolted on, it was off to a nearby parking lot for a test run. The No. 900 motor is a

(Continued on page 156)



1/32 MINI 4WD CARS AND TRUCKS

by WALLY DAVID



LITERALLY POCKET ROCKETS!



NEXT HOBBY BOOM?

WHAT HAS 4WD, rubber tires, a detailed plastic body, is battery operated, and can fit in your pocket?—a car in the 1/32-scale Mini 4WD Series from MRC/Tamiya*. You can have a whole fleet of off-road buggies and monster trucks that are modeled after the actual 1/10- and 1/12-scale versions.

The Racing Mini 4WD series includes the Hornet Junior, the Fox Junior, and mini versions of the Boomerang, Bigwig, Hot Shot and many others. If monster trucks are more your style, the Wild Mini 4WD Series includes the Blackfoot, Monster Beetle, Clod Buster, Lunchbox and Midnight Pumpkin.

Each car comes with rubber tires that are spun by a simple 4WD shaft-drive system, and there's a choice of two gear ratios. A plastic chassis houses a mini electric motor and two AA batteries. No gluing or soldering is required; just snap the car together. It really *is* just a snap!!

These mini cars have highly detailed plastic bodies. While colorful decals provide most of the details for duplicating the larger-scale versions, some painting is required for the best-looking results. If looks are what you're after, you can add decals with different stripe patterns and light-reflecting glitter, and also sponsor symbols. Gold, silver and white wheels with aero-style discs really dress up your car, and by adding black, blue or green sponge slicks, you can create a real dazzler. The racer can be customized even further with a number of different add-on wing and duct sets.

Once you're used to the speed of these mini machines, you can modify them. For high performance, Tamiya makes a Hyper Mini Modified motor that significantly increases torque and rpm. To this, add rechargeable Ni-Cd batteries and a Tune-Up Gear Set, and you'll *really* improve your performance! Similar hop-up accessories are available for the Wild Mini Series of trucks.

For all-out racing, you'll need the

Wide Tire Set with wheels. This combo, which lowers the center of gravity and extends running time, is wider and has a smaller diameter. To lighten the car, two clear-body sets are available.

You won't need a radio for these mini cars; just turn them on, and they go wherever *they* want to! For organized races in Japan, walled tracks guide the cars. Think of them as a combination of slot-car tracks and pinewood derby tracks. There are obstacle courses, ovals, dragstrips and more,

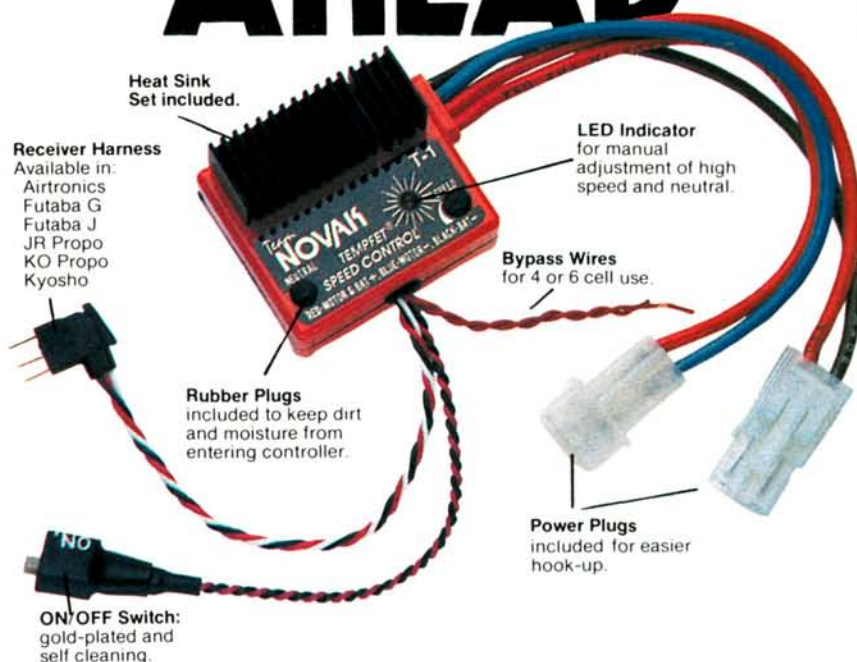


and this is where the different gears and tires really come into play. You'll need a special set that includes protruding wheels and metal rollers so the cars can skim the walls of the track without too much friction.

I don't know of any track of this type in the USA, but they're extremely popular in Japan because space is so limited. It's uncertain whether the racing aspect of the Tamiya Mini 4WD Series will catch on here, but it's neat to have scaled-down versions of R/C cars that you can detail and run where you'd *never* think of taking the big ones.

**Here's the address of the company mentioned in this article:*
MRC/Tamiya, 200 Carter Dr., P.O. Box 267,
Edison, NJ 08818.

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Braking Power (A)	26	26	52
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TOP CAT

(Continued from page 32)

rods with Z-bend ends. Though they seem a little outdated, these Z-bends apparently work well on my Top Cat.

Toe-in is controlled by turnbuckle control links, and Schumacher suggests that you dial-in zero degrees when the car is resting in its usual ride height, with battery, motor, etc., installed. Camber isn't adjustable and varies from zero degrees when the arms are fully extended to radical negative camber when fully collapsed! With the car set on a flat surface and the nose pushed all the way down, the tops of both front wheels lean toward each other at about a 75-degree angle. Camber on the rear wheels is adjustable with turnbuckle links, and toe-in may be modified as described earlier.

The front suspension's controversial lay-down shock arrangement is simpler than you might, at first, think. A bolt-on strut on each lower A-arm pushes inboard against a simple lever that converts the up-and-down action of the shocks to rearward-and-forward movement. This is a radical departure from more conventional off-road suspension geometry, and I'm sure that many will be watching to see

how well it performs.

A 6-cell battery pack can be mounted lengthwise in the chassis with the single battery holder supplied; alternatively, it can be mounted widthwise by using an additional holder. Lengthwise mounting is better suited to off-road racing, but widthwise might be better for oval.

The belt-drive transmission was comparatively simple to build, but the part about gluing a die-cut disc of sandpaper-type material to a steel thrust washer was a bit strange! This "friction" paper apparently prevents the thrust washer from spinning on the washer carrier. The entire differential assembly is built onto a single axle with a slot-head cap on one end for "outside" diff adjustments. With the diff assembled, pulley flanges are attached to both sides of the pulley using six, 2x3/8mm, self-tapping screws that must all be tightened to the same degree of torque. The slider-type drive shafts are connected at each end with chrome-steel universal joints. (A fiberglass tool in the kit makes this task easier.)

The tranny housing consists of two aluminum side plates (left and right) and a plastic center body. Eccentric bearing housings on each plate carry the output shafts and bearings and control the ten-

sion of the drive belt. Another missing part! The absence of one of the two small plastic bushings that go on either side of the idler-pulley's lay-shaft prevented this car from visiting the racetrack for a few weeks. I just had to wait for the mailman to bring them! These plastic bushings aren't needed if your kit contains brass oilite bearings. Oh well, at least I was able to properly detail the body shell while I waited.

Planning to campaign this car in club-night racing at local outdoor tracks, I wanted it to be highly visible, so I painted the shell with Pactra's* Fluorescent Yellow and accentuated this with fluorescent orange and red stripes! Dahm's* Instant Window Tint was a great finishing touch, and when everything was finished, this baby practically glowed in the dark!

When the needed parts eventually arrived, I hastily finished the tranny for a test run. The main drive gear is held on the lay-shaft with a rubber O-ring, and I question the use of this. Before you install the tranny on the chassis, the belt tension must be checked through an opening in the tranny's bottom. Even though this opening is covered when the tranny is mounted to the pan, to ensure a good

(Continued on page 112)

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TOP CAT

(Continued from page 108)

dust seal, it might be a good idea to apply a small bead of a removable silicone sealant around this opening as well as on the tranny side plates.

The wing is held on with rubber O-rings. (Does Schumacher own an O-ring-manufacturing plant?!) The antenna tube mounts directly on the rear bulkhead without any extra hardware, and the finished body shell is mounted on the chassis with Velcro pads.

Heart and mind for this knight come from a Novak* T-4 electronic speed control, an NER-2X band receiver and an NES-1A servo, and muscle is supplied by a Twister* Super Stock motor. Off to the nearest arena for a tournament!

PERFORMANCE: Radio Control Race Cars of Riverside, CA, was a likely place to test this new hot number. The track has lots of straights on which to turn the horses loose, and it also has two King Kong killer jumps that are definitely *not* recommended for squeamish drivers.

With three fully peaked 7.2V battery packs, I ran the Top Cat wide open! It was fast and smooth. The suspension was very responsive over rough moguls, and the car darted from one turn to the next. The track's condition was slightly dry and loose, but the Cat's rear end held well and didn't slide out easily or unpredictably. The supplied 22-tooth pinion meshed to the 95-tooth spur (all 48 pitch) proved to be a good starting gear ratio. I was getting wide-open runs of up to 8 minutes on regular Sanyo* SC packs, and this suggests that I'll be able to use a much higher gear for competition.

During its first race, the shock struts on the front kept hanging up, and I found one wheel or the other stuck in the up position during each qualifying run. The problem was somewhat alleviated by installing surgical tubing (approximately 10mm long) on the shock shafts between the bodies and the front mounts to limit the upward travel in the arms. This "hang-up" problem prevented me from qualifying any higher than 7th in the B-Main Stock Class, but in the final race, the Top Cat performed flawlessly and, at the finish line, I was in 1st place, a full lap ahead of the field!

Even though this new knight has a few kinks in its armor, the Top Cat is a formidable challenger in the off-road arena. The biggest problem facing owners of this car is the fact that replacement parts are extremely hard to find, and this will obvi-

(Continued on page 114)

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CCP-1003	2 Gearcases	\$19.95
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CCP-1005	8 Shock Covers and Mounts	\$16.95
CCP-1006	Chrome Rims (pair)	\$15.95
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TOP CAT

(Continued from page 112)

ously affect its future. The Top Cat's importers will have to alleviate this situation before anyone can consider racing this car regularly.

*Here are the addresses of the companies mentioned in this article:

Associated Electronics, 3585 Cadillac Ave., Costa Mesa, CA 92626.

Kyosho/Great Planes Model Distributors, P.O. Box 4021, Champaign, IL 61820.

Team Losi, 1655 E. Mission Blvd., Pomona, CA 91766.

Trinity, 1901 E. Linden Ave., Linden, NJ 07036.

TRC, P.O. Box 1058, 2211 Charter St., Albemarle, NC 28001.

CRP, 3250 El Camino Real, B-3, Atascadero, CA 93422.

Pactra (Plasti-Kote), 410 N. Michigan Ave., RM. 1280, Chicago, IL 60611.

Dahm's, P.O. Box 360, Dept. A, Cotati, CA 94931.

Novak Electronics Inc., 128-C E. Dyer Rd., Santa Ana, CA 92707.

Twister Motors, 657 E. Arrow Hwy., Suite H, Glendora, CA 91740.

Sanyo Electric, Battery Division, 200 Riser Rd., Little Ferry, NJ 07643. ■

TRANSMISSIONS

(Continued from page 53)

Performance

This is what we've been waiting for! Which one is really best? The results sur-

prised me, and I bet they'll surprise you, too. First, I'll describe the test conditions:

I used an RC10 set up with a Trinity wide graphite chassis, Trinity Universal swing shafts (except for the Track Master), a Reedy* Competition Stock motor, a Novak* T-4 speed controller and receiver, and a Futaba* transmitter and S-148 servo for steering.

Apart from the Track Master, which has its own built-in motor plate, the transmissions were bolted to a Litespeed* heat-sink motor plate. The final drive ratios for all transmissions were kept as similar as possible. The ratio used was selected to get as much speed from the transmissions as possible and still make a running time of 4 minutes. Power came from three Dymond 1200mAh 7.2V battery packs.

Before the car was put on the track, a spare 05-type motor was installed and the transmissions were allowed to run (without wheels) on the bench for 10 minutes. This was the only break-in performed before the test.

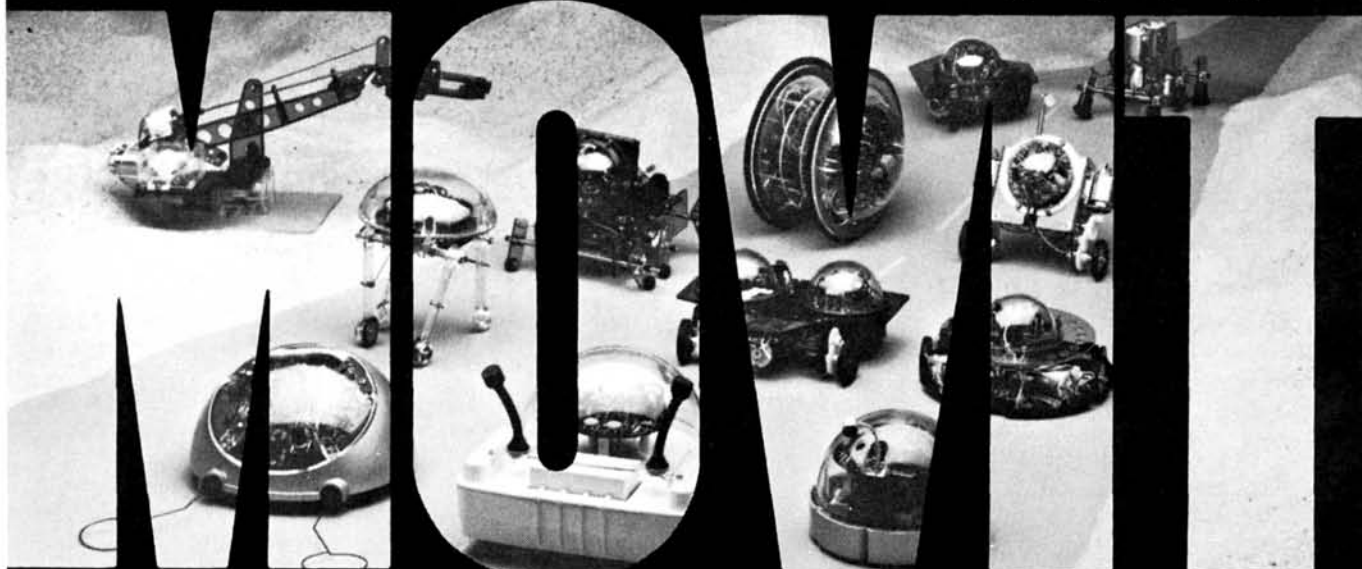
The track had a 90-foot straight with a moderate jump at the beginning of it, followed by a tight 160-degree turn into a 60-foot straight with two very tight S-bends at the end. This course is a challenge!

As expected, the Associated tranny was very smooth, and consistent laps gave it the best average lap time for the three official runs. Its average lap time was 16.44 seconds (15.18 seconds was the fastest, and 18.06 the slowest). It always ran at least 4 minutes, with an average running time of 4 minutes, 16 seconds. The driver's part in this can't be overlooked. It so happened that my cleanest runs were with the Associated transmission, which makes its performance look good, but in truth, it wasn't bad anyway!

The MIP transmission worked very smoothly right out of the bag, and the car seemed to handle the curves better than with the other transmissions. The car was easy to drive, but it had such explosive speed that I found myself over-driving it into the turns, so my runs weren't as clean as they could have been. This actually hurt this performance test, but it produced the fastest single lap time of 15.15 seconds. Unfortunately, a couple of 20-second-plus laps, the slowest being 20.95 seconds, kept the average to 16.48 seconds. With an average total running time of 4 minutes, 49 seconds—the longest of those tested—perhaps I could have pulled a little more speed out of this tranny with

(Continued on page 126)

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NORRCA WINSTON CUP

Full force on a California course

by DANNY BATINICH

IT WAS EARLY on Sunday morning at the Ranch Pit Shop in Pomona, CA, and NORRCA had called a gathering of the area's finest on-road racers so that champions could be crowned. Hopefuls had traveled far to pit their cars against one another and to determine the Winston Cup Series points winners.

As the day began, there was pandemonium in the pits as crews disassembled and cleaned, and fixed any defects, and everyone dreamed of carting away a big trophy. Having already done this at five other tracks in the recent past, the drivers were friends and acquaintances. They had fought a long, drawn-out (but good-natured!) fight, and now, the finale! All classes ran NASCAR bodies, and the Ranch Pit Shop looked like a mini River-side Raceway on Winston Cup day.

There were gear-case stock- and open-class cars, as well as direct-drive stock and

open cars, and all were ready to tackle the flat roadcourse. You couldn't tell which were stock and which were open from the *outside*, but there was no confusion when they hit the track. Of course, there were $1/12$ scalers, and many were surprised at the start of their races when "the little ones" really took off! (They obviously weren't so "little"!)

Then the competition began, and first on the agenda was Concours. The selection was difficult, as the judges were faced with the finest-looking cars in the area. Third place went to Dennis Renwick of Palm Desert, CA, with his Parma Euro Panther $1/12$ -scale stocker. What can I say about 2nd place that I can't say about 1st? Nothing! Vern Tripp—now known as "Mr. Concours"—came to the event with two of the prettiest NASCAR replicas I've seen this year, each showing precise craftsmanship that was beyond comparison. His Associated '89 T-Bird replica of the Bill Elliott Coors car captured the 2nd-place award, and his McAllister Lumina Chevy-bodied Goodwrench copy took the top honors.



Gleaming in the sun, the cars are lined up on pit road for the Concours judges to get a good close look.



Two rounds of qualifying were run to determine the starting positions for the main events. Not only were these contenders after victory at *this* meet, but the Series championship was also at stake, and there was no clear favorite. Each class would be decided by this day's results. Every position meant points, and each point brought drivers closer to the top.

When qualifying was over and the adrenaline flow had subsided a little, the top qualifiers were as follows:

- Direct Drive Open: Barry Hedrick—15 laps in 5:07.84
- Direct Drive Stock: Mike Chavez—14 laps in 5:09.38
- Gear Case Open: Ernie Prince—12 laps in 5:07.63
- Gear Case Stock: Jim Valentine—13 laps in 5:27.24
- $1/12$ -Scale Open: S. Anders—17 laps in 6:00.41
- $1/12$ -Scale Stock: Brian Bowler—17 laps in 6:24.64

TQ pins were awarded by J.R. Sitman, NORRCA's president.

During the following 20 minutes, tension grew as everyone waited for the main events, each anticipating the thrill of victory and the agony of defeat.

In the Direct Drive Open Main, Mace Horowitz and Barry Hedrick fought tenaciously for the lead. The two were never more than one turn or a short straight apart throughout the 5-minute event, but when the checkered flag fell, it was Barry Hedrick who emerged victorious. In 2nd place by 12 seconds was Mace Horowitz, and 3rd went to Roger Vorba.

The Direct Drive Stock Class was fought even more closely. Young Paul Pat raced door-to-door with Ed Schafer, Ken Moon and Mike Chavez, and, right up till the last few laps, the race was anyone's. As the dust began to settle, however, Chavez came across the line in 1st place; Pat put on quite a show to hold onto 2nd, and Schafer took 3rd.

The Gear Case Open Class was also very exciting, as Len Lee, Ted McDonald and Ernie Prince were all on the same lap

The 1/12-Scale Open cars made me think of V-8s in go-carts! How can something so small go so fast with so much control?! Wow! What a show these drivers put on! Five tiny NASCARs, each with a powerful open motor, sprang to life, and, from the beginning, Bev Pritchett, Jose Ponte and S. Anders jockeyed for the lead. Pritchett made a fine showing with a 3rd-place finish, Ponte stayed ahead of her for 2nd, and a beaming Anders won the race easily. (I think it was his first NORRCA win.)

The 1/12-Scale Stock A-Main was won by Garry Hedrick with 16 laps in 6 minutes, 00.58 seconds; TQ Brian Bowler came 2nd (16 laps in 6 minutes, 04.53 seconds; and 3rd-place finisher Jeff Hamilton also managed 16 laps.

This race was the last of NORRCA's six-race Winston Cup Series. The competition was fierce throughout, with most titles being decided on the last weekend. The 1st-place finishers in the series are as follows:

- Direct Drive Open: Chuck Van De Weghe



Concours winner Vern "Mr. Concours" Tripp (left) took 2nd place by using Associated's '89 T-Bird to make a replica of Bill Elliot's Coors Motorcraft car, and he snagged 1st place with a Chevy Lumina Goodwrench copy using a McAlister body. Dennis Renwick captured 3rd place with his 1/12-scale stocker.

when the race finished, and 12 seconds separated them as they crossed the line. Prince crossed the finish line 2 seconds ahead of McDonald, and Lee was in 3rd place, 10 seconds behind him.

When the Gear Case Stock Main started, Carlo Bruno quickly took the lead and held it all the way to the last two laps. Then Jim Valentine slipped past him on the inside of the "carousel" (a 270-degree sweeping left-hander) and took the lead with less than 30 seconds to go. Bruno tried too hard to catch Valentine and spun, and Bob Baxter caught him, couldn't pass him, and finished 3rd. Bruno went on to capture the 2nd spot, and Valentine brought home the "big one."

- Direct Drive Stock: Mike Chavez
- Gear Case Open: Ernie Prince
- Gear Case Stock: Rick Winters
- 1/12-Scale Open: Chuck Van De Weghe
- 1/12-Scale Stock Class: Brian Bowler

To all the racers who participated in this long, highly competitive series: Well done! Series races are a lot of work, and a special thanks should go to Director Chuck Mann and the many NORRCA officials who expended so much time and energy to sanction them. Let's also not forget the very generous sponsors who provided the trophies and thousands of dollars in prizes and gift certificates. To all of you, thanks! We all had a great time!

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Chevrolet's newest stock-car body, the 1990 Lumina, is now available from BoLINK. The 1/10-scale Chevy Lumina is ready for action now! Price: No. BL-2350, '90 Chevrolet Lumina, \$18.

For further information, contact BoLINK R/C Cars, Inc., 420 Hosea Rd., Lawrenceville, GA 30245.



DAHM'S STICKER KITS

Dahm's Sponsor Decal Sheets are now available in four colors: red, white, blue and black! Each sticker kit includes two sponsor sheets; two red, white and blue stickers; two sticker strips; and instructions. Price: \$2.98 for 2 sheets.

For more information, contact Dahm's, P.O. Box 386, Cupertino, CA 95015-0386.



HIROBO JEALOUSY 4WD

The Hirobo Jealousy is a true performer. It has what it takes to be competitive: fully enclosed belt drive, machined-aluminum suspension arms,

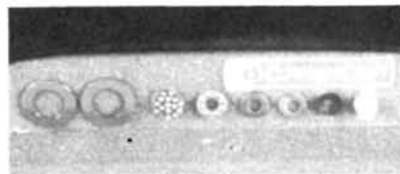
oversize shocks (70 percent more absorption), low center of gravity, aluminum dogbones and ball bearings throughout. Price: \$559.99.

For more information, contact Hobby Dynamics, 4105 Fieldstone, Champaign, IL 61821.



COMPOSITECRAFT PREDATOR AND LYNX ADJUSTERS

Now available for the Predator and Predator Lynx are these CompositeCraft glass-filled, molded pod sides and ride-height adjusters. Ride-height adjusters can also be used in Associated 12Ls. For pod sides, including ride-height adjuster, order part No. 50055 (\$15.95); for ride-height adjusters only, order part No. 50054 (\$2.50).



DIFF REBUILD KIT

CompositeCraft, Inc., now offers its complete line of differential parts in one economic and convenient diff rebuild kit. The kit contains two diff washers, one thrust bearing assembly, one cone washer, one 8-32 nylon locking nut, and 16 high-grade diff balls (super balls). Price: \$5.

For more information, contact CompositeCraft, 2400 Sand Lake Rd., Orlando, FL 32809.

Descriptions of new products appearing on these pages were derived from press releases supplied by the manufacturers and/or their advertising agencies. The information given here does not constitute endorsement by **Radio Control Car Action**, nor guarantee product performance or safety. When writing to the manufacturer about any product described here, be sure to mention that you read about it in **Radio Control Car Action**.



RCRC CHALLENGER SPRINT CAR KIT

The Challenger Sprint Car Kit for the RC10, Ultima, and JR-X2 is available in aluminum roll cage with accessory items and chrome-moly roll cage with accessory items. Built in the USA by Fred Muehlenhort of RACTEC, this is the first engineered sprint-car kit built by a person who builds real sprint-car chassis! Price: JR-X2, \$124.95; RC10, \$139.95; Ultima, \$154.95.

For more information, contact RCRC Inc., 18240 S. Vermont Ave., Gardena, CA 90247.



DURATRAX GRAPHITE CHASSIS

New from DuraTrax is an economically priced graphite chassis that allows drivers of Kyosho's Ultima and Associated's RC10 to hop-up their cars for the best performance at the track. Constructed of a strong 1/10-inch-thick graphite plate, the new chassis has a high percentage of graphite content for extra rigidity; in fact, these are the most rigid graphite chassis available. All are precision-machined to strict specifications for race-winning results, and, with its low price, anyone can be a contender! Price: \$59.95.

For more information, contact DuraTrax/Great Planes Model Distributors Co., P.O. Box 4021, Champaign, IL 61820.



TEAM LOSI MONSTER-TRUCK GEAR

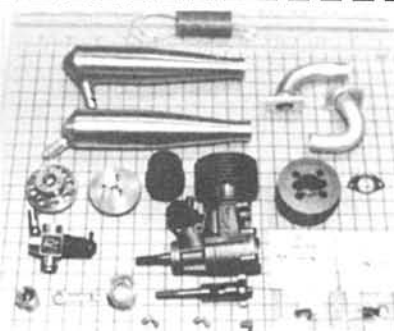
Team Losi now offers an 86-tooth spur gear for the JR-X2. This extra-large spur is ideal for super-hot motors and the big-wheeled monster trucks. Like all Team Losi precision gears, the No. A-3886 86-tooth spur features computer-designed, full-contour teeth and special low-friction material for the best possible mesh, life and performance. Price: \$3.



ULTRA-HOT RACING WHEELS

New ultra-hot Team Losi racing wheels are now available for the JR-X2. These super-tough nylon wheels are available in fluorescent wild red and hot orange, as well as in a "natural" white that can be dyed. Both front and rear wheels are available in all three colors at the same economical price. Front part Nos. A-7000, 7001, 7002; rear part Nos. A-7100, 7101, 7102 (orange, natural, red). Price: \$5/pair

For further information, contact Team Losi Inc., 1655 E. Mission Blvd., Pomona, CA 91766.



WEST COAST ENGINES McCOY RACING ACCESSORIES

West Coast Engines has purchased the popular McCoy line of 1/8-scale racing products for .21-powered R/C cars. The company will cater to model-engine enthusiasts by manufacturing and selling only top-of-the-line products. Pictured are tuned pipes, manifolds, lightweight flywheels and clutches, glow plugs, and Novarossi engines and parts—just a few of the many gas-racing accessories available. A new product-line catalogue is available for \$1.

For more information, contact West Coast Engines, 10771 Monte Vista, Ontario, CA 91762.



TWINN-K NYLON ADAPTERS

Twinn-K's new nylon adapters are designed to convert its BBS rims to fit the RC10, Tamiya and Kyosho cars. For those who have off-road cars and want to experience the thrill of road racing without buying a new car, these adapters make it possible—they're strong, durable and economical. Price: No. 0177, BBS to EC10, \$3.95/pair; No. 0178, BBS to Tamiya, \$3.95/pair; No. 0179, BBS to Kyosho, \$3.95/pair.

For more information, contact Twinn-K Inc., P.O. Box 31228, Indianapolis, IN 46231.

WHAT'S NEW



TRINITY RC MOTOR CASE

The RC No. 4052 Motor Case is the first motor case designed especially for R/C car motors, and it's obvious that the needs of the racer were taken into consideration. The Trinity Motor Case holds the motor by the can to keep the shaft from banging against the case, as motors do in motor tubes. It prevents the shaft from bending and from popping off the end bell on a stock motor. It also prevents the possible misalignment of the bearings. The Motor Case has two built-in compartments to hold motor springs, brushes and mounting screws—there's even a place to hold four pinion gears. This is an excellent way to keep all your motor's accessories together in one place! Price: \$3.99.

For more information, contact Trinity, 1901 E. Linden Ave., Unit No. 8, Linden, NJ 07036.



EDGE PRODUCTS NEW COMPOUNDS

Designed for the serious racer, these commutator cleaning sticks will keep your electric motor running strong. The commutator sticks are available in three different compounds: red, which is the

original for stock motors and maximum cleaning; blue, designed for modified motors that need less abrasive and more polishing compounds for maximum performance; and green, designed for the serious racer who wants to touch up the motor to a high polish, either after the heat or before the main. Available separately or in combo packs. Price: \$4.95 each; \$13.95, combo set.

For more information, contact Edge Products, 2520 H St., Suite D, Bakersfield, CA 93301.



ACOMS DC QUICK-CHARGER

It can be frustrating when you have to take the time to recharge your 7.2V 1200 mAh Ni-Cd batteries. Although it won't lessen this time, the ACOMS Quick-Charger (designated the HU-200) does work reliably and safely, and it won't stretch your budget.

This compact unit comes with a reliable 15-minute timer encased in strong engineering plastic. An LED indicator lamp lets you know when the charger is pumping out the amps needed by your Ni-Cds. A 7.2V battery connector is pre-wired to the system, as is a 33-inch 12V DC input power cord with a cigarette-lighter plug factory-attached to it. For easy access, an 8-amp replaceable fuse is conveniently located inside the plug.

If you have access to a 12V DC cigarette-lighter socket and have 7.2V 1200mAh Ni-Cds for your car, boat or plane, this ACOMS Quick Charger is ready to serve your needs. Price: \$18.98.

For more information, contact Altech Marketing, P.O. Box 391, Edison, NJ 08818.



PARMA REPLACEMENT WHEELS AND TIRES

New from Parma, these replacement wheels and tires for the Tamiya Grasshopper, Grasshopper II, Hornet, and others are great for the budget-minded enthusiast. Each pair contains gold-plated wheels, molded rubber tires, and all necessary hardware. Price: \$10/pair.

For more information, contact Parma, 13927 Progress Pkwy, North Royalton, OH 44133.



REEDY POWER-MATCHED PACKS

Built by LavCo to Mike Reedy's engineering specifications, each pack contains cells that have been individually tested by a precision analyzer. Once packaged, the cells are grouped so that you can choose from three race-winning categories. The winning combination of Reedy modified motors and batteries has won five IFMAR world championships! Reedy power SCR and SCE batteries come in a useful, reuseable container for battery storage. Price: \$42 to \$63.

For more information, contact Associated Electrics, Inc., 3585 Cadillac Ave., Costa Mesa, CA 92626.

Descriptions of new products appearing on these pages were derived from press releases supplied by the manufacturers and/or their advertising agencies. The information given here does not constitute endorsement by **Radio Control Car Action**, nor guarantee product performance or safety. When writing to the manufacturer about any product described here, be sure to mention that you read about it in **Radio Control Car Action**.



PRO-LINE JR-X2 REPLACEMENT WHEEL

Pro-Line has just come out with a direct replacement wheel for the JR-X2. This wheel is considerably more resistant to breakage, and its solid face prevents dirt from clogging the wheel and entering the bearings. Price: \$5.95/pair.

For more information, contact Pro-Line P.O. Box 456, Beaumont, CA 92223.



MARK ALLEN MONSTER-TRUCK DECALS

Mark Allen R/C announces its new Custom Monster Truck Decal sheet for all popular 1/10- and 1/12-scale R/C vehicles. Professionally designed and quality printed, this giant 10x12-inch Mylar sheet has over 20 different big-monster names and truckin' slogans—the perfect way to make your vehicle really stand out and force the competition to take notice! The double-size sheet includes instructions for adding further custom painting to your logo graphics. Price: \$8.50.

For more information, contact Mark Allen R/C, 400 W. Roosevelt, Suite 2NW, Dept. CA, Wheaton, IL 60187.



KYOSHO BUICK STOCKER

Kyosho hits the NASCAR scene with the release of their new on-road Buick Stocker. This 1/12-scale almost-ready-to-run NASCAR replica features a rear-axle differential and an adjustable, independent front suspension for great handling. Designed for the beginner, the Buick Stocker is about 80-percent factory-assembled, and the chassis design makes radio installation and servo adjustment remarkably easy.

The Buick Stocker includes a competition-proven LeMans Stock 05 electric motor, so speed is no problem! Decals are included with the clear polycarbonate Buick Stocker body, which is one of the most popular body styles available. A 2-channel radio and 6-cell battery with charger are required. Price: \$119.95.



RAMPAGE

Racers looking for the thrill and excitement of high-speed off-roading can now find it in the new Kyosho Rampage. This 1/10-scale off-road gas buggy features an award-winning Ultima front end that gives it superior handling and suspension good for any terrain. Modelers will appreciate the recoil pull starter (used on the CZR engine) included in this kit. Just grab your fuel, transmitter and Ni-Starter, and you'll enjoy a freedom most uncommon with electric buggies. Running times of up to 10 minutes can be expected on just one tank of gas.

New, low-profile, mini-spike tires, black oil-filled shocks and an aluminum chassis are only part of this high-performance machine. And many hop-ups for other cars in the Kyosho lineup are also acceptable for the Rampage. A 2-channel radio is required. Price: \$359.95.

For further information, contact Kyosho/Great Planes Model Distributors Co., P.O. Box 4021, Champaign, IL 61820.



TAMIYA FIRE DRAGON

Tamiya insists on a shaft-driven 4WD system for reliability and power-transfer efficiency. Tamiya's superior engineering and well-written instructions make the assembly of the 4WD off-roader easy. The chassis is a high-strength ABS resin plastic, as is the front and rear double-wishbone suspension that offers low weight, strength, and great handling.

The Fire Dragon takes the roughness out of the ride with its Tamiya C.V.A. coil-over oil-filled shocks on all four suspension arms. Inside the chassis is a three-step forward and reverse speed control, a 540 motor that pounds out the power, plus a steering servo-saver set that permits quick steering and protection for your servo. The Fire Dragon utilizes a Tamiya 7.2V racing-pack battery and any 2-channel BEC R/C system or a standard system with an optional Tamiya battery eliminator. Price: \$190.12.

For further information, contact Model Rectifier Corporation, 200 Carter Dr., P.O. Box 267, Edison, NJ 08818.

DIRT DIGEST

by BILL O'BRIEN & BOB KANE

BELT BINDS AND SCALE SLICKS

WELL, NOW WE know that if you uncork Bob, he'll let you have it with both barrels. He's promised to relate the glow-engine stuff from last month to two of the cars we have: a Kyosho* off-road Burns and an Associated* RC-500. I was about to take my .21 VR-B out of the Burns and put it in the RC-500, until Bob slapped my wrist and made me buy a .21 EX-R, but he won't tell me why until next month. That's okay, there are other things to discuss this time.



Belt Sander

Earlier in the year, I might have mentioned that the very first brand-new R/C car I bought was a Hirobo* Alien Mid 4. Hirobo had its mid-engine 4WD buggy on sale a good year and a half before anyone had even thought about dragging the weight of an electric motor from way back there behind the rear axle to the middle where it offers better balance. But the real thrill of the Alien was its drive system. It uses a belt—also not in vogue at the time—with the main players running chains or shafts between the front and rear differentials.

I ran that car for about a year, and it was slicker than Slip-It! on dirt. When I

bought my first Optima Mid, it seemed logical to pit the two mid-motor beltlers against each other. I was surprised to find that when both cars were equipped with LeMans 360ST engines, the old Alien was the faster of the two. I wasn't sure why that happened, but I always thought that the Optima was dragging a little.

A few months ago, *Car Action* asked me to stretch one of my Mids with a JG* fiberglass long chassis kit. After surgically removing the OEM chassis for the transplant, I put it aside somewhere and, eventually, it became submerged under several other concurrent projects. Last week, it resurfaced, and I took a long, hard look at it.

Among the stains and discoloration resulting from hard use and CA adhesives was a bright, polished stripe. The shiny stuff was on the top of the chassis, where the belt travels round and about the

front and rear diffs, and, apparently, rubs against the chassis. The Hirobo Mid 4 solves the problem by providing a channel into the lower chassis plate that adds $\frac{1}{8}$ inch for the belt to expand as it travels. Kyosho apparently felt no need for it, but that doesn't mean you can't add one of your own.

You'll need a Dremel tool, or a good eye and a small box file. Using the stripe on your chassis as a guide, cut away the shiny area until you cut all the way through. When you're done, make sure that you chamfer down the edges of the channel that you've cut and that there are no sharp edges. You don't want the belt to rub against a razor-sharp edge and cut itself in two. To be extra safe, cut the slot a little wider, and cover the fresh edges with electrical tape. To prevent dirt from entering the belt system from the bottom of the chassis, cover this narrow chasm with a spare lower belt cover. Trim it to fit and glue it in place. (You can do this even if you've added a longer chassis.)

Re-Tired

I don't have a wide enough lens to give you a photograph of all of the tires I own. Suffice it to say that I have an average of eight to twelve spares per vehicle. I have

(Continued on page 126)



The stripe on the Optima Mid chassis is the result of belt contact. Although you can channel out the stock metal chassis (see text), a better and easier solution is to use one of the stretch kits and operate on a graphite or fiberglass chassis.

DIRT DIGEST

(Continued from page 124)

eleven cars and six monster trucks, and I recently started running dragsters. I wanted to add some foam to my spiked-rubber farm, but I was perplexed when I went up to Fine Design* to run at the indoor drag track. (Even though I write a column called "Dirt Digest," I still like cars that don't get dirty. We'll get back to dirt later.) There I was with one of Fine Design's own 1/10-scale streamlined dragsters, and I had the largest rear tires of anyone there. I had a long chat with Chris Fine and Rich Roth and found out a lot about the word "scale" and how it applies to tires.

The National Hot Rod Association (NHRA) allows full-size, top-fuel rails to have a wheelbase between 215 and 300

inches, so a 1/10-scale reproduction would have a wheelbase between 21.5 and 30 inches. So far, the scale holds. But if you look at weight, we're actually aiming at about 2.5 pounds, or around 1/1000 full-scale weight. Actual speeds of the scale rails are currently in or around 60mph, which is 1/4 full-scale. The best scale times are at the 2.1-second mark, which is about 47 percent of full scale.

Now, that's a hodgepodge of scales! Fine Design sells its rails with tires that are true to scale. According to Rich Roth, people want to see those large slicks stuck on the rear end of their dragster, just like

they are at the track. Sounds nice, but it doesn't work quite as well. Apparently, the large mass and rotating size of a scale tire will get you from start to finish line, but it won't allow your motor to exercise its full potential (the final drive ratio is the ratio of the gears and the diameter of the installed tires). You'll end up somewhere in the mid- to high-30mph range, and that's just not competitive.

Roth recommends that the largest tire you run on a 1/10-scale dragster shouldn't exceed 2.25 inches. It may look a little funny at first, but you'd be surprised at just how little you can actually see of your car at 50 to 60mph. You won't notice the down-sizing at all after a short while.

Based on my experience with Fine Design's Streamlined Rail, Roth is 100-percent correct, so whether you true your tires down to that size (see the '89 *Car Action Yearbook* or the July '89 issue for details) or buy your spares pre-trued and glued, you won't be wasting your time or money.

Next Month

Okay, we're out of time and space again. Next month is a complete blank right now. I'm working on some problem areas in two cars: a Kyosho Maxxum and a Yokomo YZ-10. I'm royally upset about ROAR's decision to place the 2WD, front-wheel-driven Kyosho car into 4WD competition classes to protect the current crop of 2WD rear-drive cars (ROAR's words, not mine). Although the 4WDs have a big advantage in traction and power out of a turn, the Maxxum will give

(Continued on page 160)

TRANSMISSIONS

(Continued from page 114)

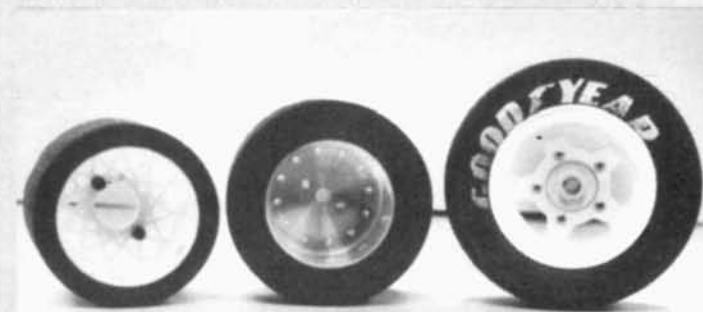
an extra tooth on the pinion gear. The car seemed to go fastest with this transmission, but the poor laps hurt the data used to evaluate the transmission.

Team Pit Stop has a real screamer here. The car explodes from the turns and burns down the straights. My laps were much more consistent during this test, because I'd had some practice with a really hot transmission during the MIP test. The fastest lap turned with the Team Pit Stop tranny was 15.47 seconds, but the slowest lasted only 17.57 seconds. These consistent lap times were partly the result of the transmission's smoothness in the turns and its excellent response coming out of them. The average lap time was 16.46 seconds (only 0.02 second slower than that of the Associated tranny), but it didn't seem to go as fast down the straights as the MIP-equipped car. Some of the runs lasted less than 4 minutes, and this means gearing down to make the time. Some straightaway speed will be sacrificed, but the car can be driven harder into the turns and will come out even faster. The average running time was only 4 minutes, 5 seconds, and two of the three test runs were shorter than 4 minutes.

The Track Master transmission was the easiest to drive, but it was also the slowest. The best lap time was only 15.86 seconds; the slowest was 18.92 seconds; and the average was 17.01 seconds. Only one of the runs lasted for more than 4 minutes (4 minutes, 7 seconds). The run I made to check out the tranny and to adjust the diff before the official runs didn't even last 3 minutes. The tightness of the transmission tended to drag the performance way down from what seems to be its potential, but, as I previously mentioned, the Track Master did seem to loosen up the more it was run.

I'm not sure whether these tests really proved the potential of these fine transmissions. Only if these units had been completely broken-in, tuned up, and driven by someone who's accustomed to their different driving characteristics would the tests have been conclusive. I've installed all these transmissions in various cars, and I've run them all for several weeks. I like them all for different reasons and types of racing. The real bottom line is that in the hands of a top driver, no

(Continued on page 128)



Three tire sizes that are popular at the drag strip. The one on the right might look the most scale-like, but its larger diameter and rotational mass make it a loser. The center tire is from Fine Design, and even they recommend using a lower profile if you're a serious racer. The tire on the left is a TRC blue dot on BBS wheels, and this comes closest to ideal specifications. A tire-truing machine should get them all down to at least 2.25 inches.

TRANSMISSIONS

(Continued from page 126)

particular transmission seems to have a clear advantage.

*Here are the addresses of the companies mentioned in this article:

Associated Electrics, 3585 Cadillac Ave., Costa Mesa, CA 92626.

MIP, 838 Edna Place, Covina, CA 91723.

Team Pit Stop, 12233 SW 132 Court, Miami, FL 33186.

Track Master Mfg., 1466 Pioneerway, Suite 10, El Cajon, CA 92020.

Litespeed, P.O. Box 4765, Spokane, WA 99202.

Team Losi, 1655 E. Mission Blvd., Pomona, CA 91766.

Allec & Lane Manufacturing, P.O. Box 2115, Corona, CA 91718.

Trinity, 1901 E. Linden Ave., Linden, NJ 07036.

Reedy; distributed by Associated Electric, 3585 Cadillac Ave., Costa Mesa, CA 92626.

Novak Electronics Inc., 128-C E. Dyer Rd., Santa Ana, CA 92707.

Futaba Corp. of America, 4 Studebaker, Irvine, CA 92718.

TURBOCHARGER

(Continued from page 54)

The scary thing about the Turbocharger is its price: \$299 retail! But it would cost much more if you purchased all the components separately. Consider this: First you'll need a charger (the Tekin BC100 will do fine, at \$108); then a discharger (a Lavco with the resistor box, at \$225); a voltmeter with a 10-amp function (\$40 at Radio Shack); and a stopwatch (which most of you have, so I won't count it). Total cost: \$373! Ouch! Compared to this, the Turbocharger is a really good deal.

The Turbocharger isn't for everyone, however; if you aren't a serious racer, don't bother. Others, though, will appreciate

(Continued on page 132)



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(Graph shown represents actual core readout of Reedy Modifieds motor.)

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TURBOCHARGER

(Continued from page 128)

ciate the precision it offers when you're charging or caring for your batteries, and it will get you battery-matching (either re-matching your own, or starting with new cells). The Turbocharger is a valuable, long-lasting investment!

*Here is the address of the company mentioned in this article:

Competition Electronics, Inc., 2542 Point O' Woods, Rockford, IL 61111.

LI'L DEUCE COUPE

(Continued from page 75)

front-end blocks, and a pair of tail lights was made with metal foil and translucent red tape.

With the big rubber tires soaking up the bumps and giving a nice smooth ride, the Li'l Deuce Coupe is a great street-rod. The "locked" rear tends to cause some fish-tailing when your driving becomes a little too enthusiastic, but you can drive out of it, if you're quick on the wheel. Advance has an optional adjustable-width differential kit that will cure this, as well as a line of other accessories to improve perform-

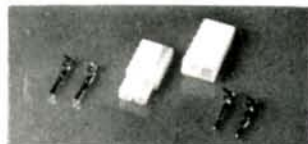
(Continued on page 135)

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C1005 BATTERY UPGRADE KIT for 6 Tamiya batteries to gold standard. \$5.00.
Includes extractor tool.

C1006 BATTERY UPGRADE KIT for Kyosho. \$5.00



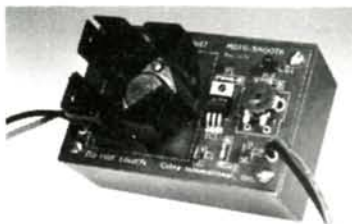
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LI'L DEUCE COUPE

(Continued from page 132)

ance or customize your rod. As you might have guessed by now, your imagination is the only limiting factor with a car like this, and there are lots of books and magazines to give you ideas. Chances are, BoLINK or Parma* will have just the body you want for your own creation.

*Here are the addresses of the manufacturers mentioned in this article:

BoLINK R/C Cars, Inc., 420 Hosea Rd., Lawrenceville, GA 30245.

Advance Engineering & Mfg. Co., P.O. Box 766, Woodland Park, CO 80866.

Futaba Corp. of America, 555 W. Victoria St., Compton, CA 90220.

Dahm's Racing Bodies & Accessories, P.O. Box 386, Cupertino, CA 95015.

Dymond, distributed by United Model Distributors, 301 Holbrook Dr., Wheeling, IL 60090.

K&S Engineering, 6917 W. 59th St., Chicago, IL 60638.

Parma International, Inc., 13927 Progress Pkwy., N. Royalton, OH 44133. ■

NEW ERA SUPERMOD

(Continued from page 79)

clutch, a chain drive goes to the rear axle. With this system, there appears to be very little power loss. Ball bearings are found in all the appropriate places. It's easy to start the engine with the top wing off its

(Continued on page 136)

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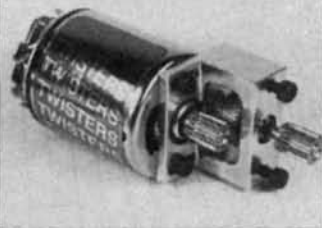
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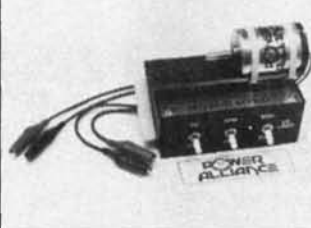


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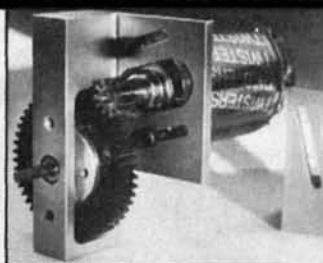
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NEW ERA SUPERMOD

(Continued from page 135)

bracket; simply press the primer bulb a couple of times, slide the choke lever forward and pull the starter handle. A gas/2-stroke oil mixture is used to power the engine. After one or two pulls, the engine was rumbling merrily. New Era also offers a tuned header that significantly increases the available horsepower.

The instructions show the large wing attached to the front of the roll cage, with

Velcro used to hold the aluminum wing to its mount. With the mount attached to the front of the roll cage, it was impossible to lower the wing to a low angle of attack. Also, the wing mount seemed to negate the aerodynamic shape of much of the bottom of the wing. I was prepared to move the wing mount to the rear of the roll cage at the slightest hint of handling problems.

A set of Race Craft* GN tires was included with my Supermodified. GN 500s were mounted on the front, two-piece,

deep-dish steel wheels, and GN 300s were mounted on the rear wheels. These tires have the rubber bands of full-size racing rubber glued to "host" tires. I'm told they won't work in all situations, but I have yet to prove this for myself. In the near future, I'll try some Delta* Gold foams.

Before taking the car for its shakedown run, I checked the throttle, steering and brakes. Everything was all right, so I fired up the Super. Before I stuck the top wing on its mount, I went out for a few practice

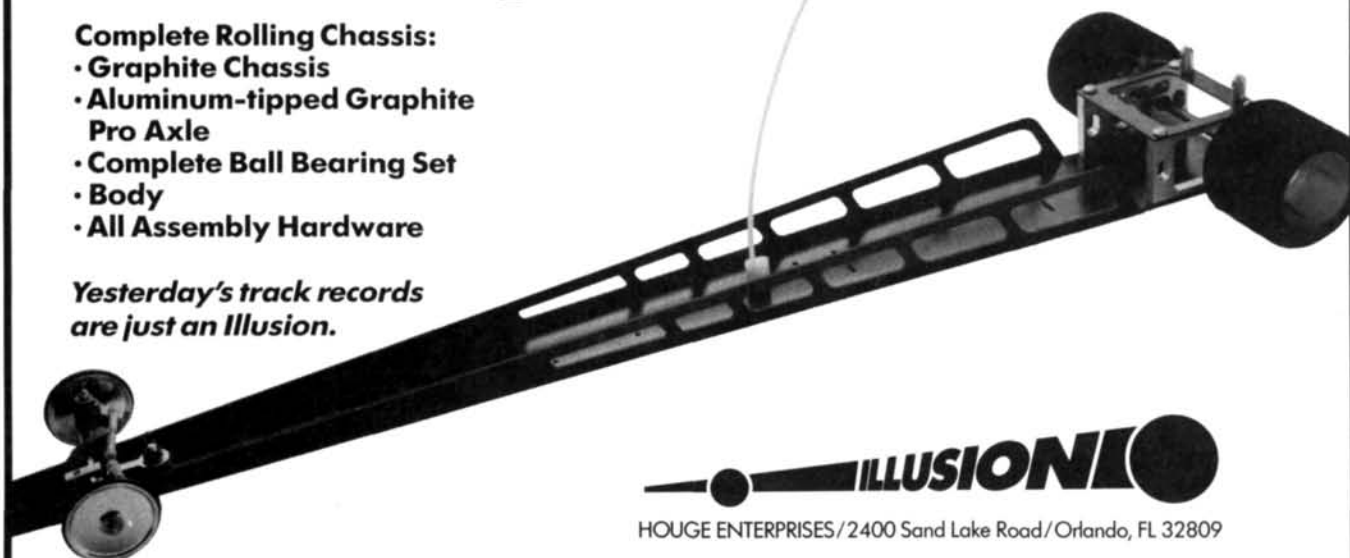
(Continued on page 140)

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NEW ERA SUPERMOD

(Continued from page 136)

laps. The car accelerated extremely quickly; even at half to three-quarters throttle, the car was fast. Without the top wing, I expected the Supermodified to exhibit oversteer, but there wasn't any, so I started using full throttle on the straights, and *still* there was no oversteer. The New

Era car was extremely easy to drive. At full speed, the car had mild understeer, with no top wing! It ran straight and true on the straightaways and, by tapping the brakes lightly as I entered the turns, I could get the car to dive through corners on a much tighter line. If I hit the brakes a hair too hard, I did a four-wheel power drift through the turn. It may not have been efficient, but it was fun. After run-

ning several hot laps, I checked the Race Craft tires and found that all four were warm across their full width. This just confirmed what I'd seen the Super doing.

I finally tried the car with the top wing, but it didn't make much difference. In fact, I've now even removed the wing mount. New Era's car is the best-handling 1/4-scale car I've driven, and it definitely

(Continued on page 142)

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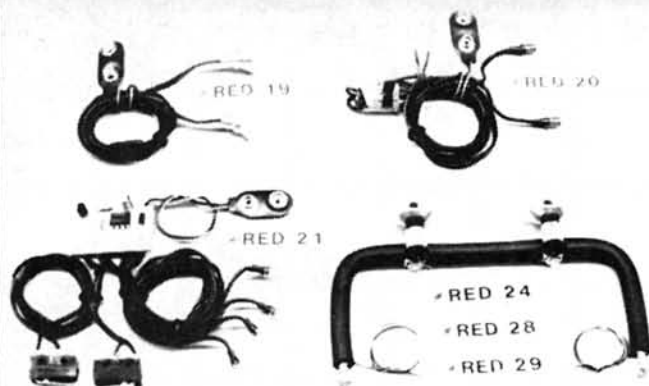
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NEW ERA SUPERMOD

(Continued from page 140)

has the potential to be a big winner on the 1/4-scale circuit.

My only problems with the Supermodified have been with its throttle and brake. The throttle cable seems to stretch, so I can't always get the carburetor to full on, and I have to be careful not to lock up the brakes and flat-spot the rear tires. These brakes are excellent; I'm sure their response can easily be softened while still providing above-average stopping power.

With the East Coast Supermodified, New Era now makes it easy for us to get into 1/4-scale racing, and the car's handling should make getting around the ovals a piece of cake—even for the newest drivers.

*Here are the addresses of the companies mentioned in this article:

New Era Models, Inc., P.O. Box 7378, Nashua, NH 03060.

Futaba Corporation of America, 4 Studebaker, Irvine, CA 92718.

Kimbrough Products, 1430 East St. Andrews Place/Unit F, Santa Ana, CA 92705.

Zenoah, distributed by World Engines, 8960 Ros-sash Ave, Cincinnati, OH 45236.

Race Craft Tires, P.O. Box 88141, Grand Rapids, MI 49508.

Delta Manufacturing, 27 Racecar Ct., Lorimer, IA 50149

SCOPING OUT

(Continued from page 81)

This speed controller showed up on my doorstep at a very good time, because I was in the process of building a car for the 2WD stock class at our local dirt-oval track. You might be thinking that a stock-class race is no test for a first-class racing

(Continued on page 144)

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SCOPING OUT

(Continued from page 142)

speed controller, but today's stock cars powered with SCR battery packs and screaming stock motors run fast and hot. When you gear any motor to dump a 1200mAh battery pack in 4 minutes, you're pulling an average of 18 amps. As I said earlier, I removed all but 2 inches of the motor and battery wiring, and, to test it at the track, I hard-wired the controller into my Ultima.

PERFORMANCE: Test-driving the car at the dirt oval, a 4-minute lap count revealed that, with the **SUPER-SPEED 1000** installed, it's now a serious contender for the 2WD stock-class A-Main. The **SUPER-SPEED 1000** is a well-made, very useable speed controller.

For new drivers, the **SUPER-SPEED 1000** will plug right into a Kyosho-style car and give a good boost in speed and run time. As the need arises, the connectors can be upgraded and the wiring shortened for another boost in run time and power.

On the negative side, I think that Kyosho could have used a slightly larger wire for the battery and motor leads. The motor leads should have been red and blue instead of red and black, because this would have reduced the possibility of making wiring mistakes when you change connector types.

The biggest disappointment comes when thinking about what *might* have been. In its present condition, the response control neither helps nor hurts the performance of the **SUPER-SPEED 1000**. When driving the car, I couldn't tell where it was set, so I just set it to the full position and then ignored it!

Almost any electronic FET speed controller will be better than the mechanical controller it replaces, but the **SUPER-SPEED 1000** has the potential to provide you with what its name implies—*super-speed!*

**Here's the address of the company featured in this article:*
Kyosho/Great Planes Model Distributors, P.O. Box 4021, Champaign, IL 61820.

DEFIANT

(Continued from page 87)

My only other complaint is that the Defiant's chassis offers very little rigidity behind the roll bar. The bulk of the car's weight (and vibration) is supported by a single-plane box frame. One or two bars should trail back from the roll cage to the rear shock mount.

(Continued on page 148)

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Thanks to Nathan Wincek for his 3rd Place finish in Tampus Winter Championships offroad race.

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DEFIANT

(Continued from page 144)

Race-tech's 1/4-scale Indy car provides the racer with a very good starting point. With the suspension adjustability offered by the Defiant, a racer should be able to get dialed-in. And the car even holds up to abuse (i.e., curbs) much better than Lolas or Marches. By the time any other company has a 1/4-scale Indy car on the

market, Race-tech will have had time to really fine-tune the Defiant. Maybe Race-tech's Defiant will even become 1/4-scale's equivalent of Penske's PC18.

*Here are the addresses of the companies mentioned in this article:

Race-tech Inc., 103 Loudon St. SW, Leesburg, VA 22075.

Airtronics Inc., 11 Autry, Irvine, CA 92718.

Futaba Corp. of America, 4 Studebaker, Irvine, CA 92718.

Zenoah; distributed by World Engines, 8960 Ros-sash Ave., Cincinnati, OH 45236.

Race Craft Tires, Box 88141, Grand Rapids, MI 49508.

WEST COAST CHAMPS

(Continued from page 91)

traffic caused a lead change. Starting from the fourth spot on the grid, Washington resident Tom Jones stole the lead from Wilson and never looked back! Jones took the win, followed by Wilson in 2nd and

(Continued on page 150)

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WEST COAST CHAMPS

(Continued from page 148)

Gene Ogle in 3rd.

● 4WD STOCK: Tom Clark must have eaten his Wheaties each morning, because he ran strongly all weekend in this class, as shown by his TQ run of 12/4:09.58 and his great performance in the A-Main. Clark assumed the point position at the start, and he held it for a well-deserved wire-to-wire win! Tony Maganuco finished 2nd and Dominic Sellers came in 3rd.

● NOVICE: Little Jeremy Hase showed the big boys what it's all about by posting the TQ time of 11/4:10.63 and keeping the heat up going into the Mains! Hase shot off the line at the start of the A-Main, assumed the point position and led the race right to the finishing line. Doug Doss came in 2nd on the same lap as Hase, and Dee Dee Tibbets finished a lap down in 3rd with the 3rd-place Concours truck.

● 2WD STOCK: The 2WD Stock and Open Classes saw the most radical-looking trucks to date! Bodies were lowered to the max with shocks and towers poking up through the hoods and rear decks. This is Kyle Reed's territory, and he proved it with a TQ run of 12/4:02.59,

(Continued on page 154)



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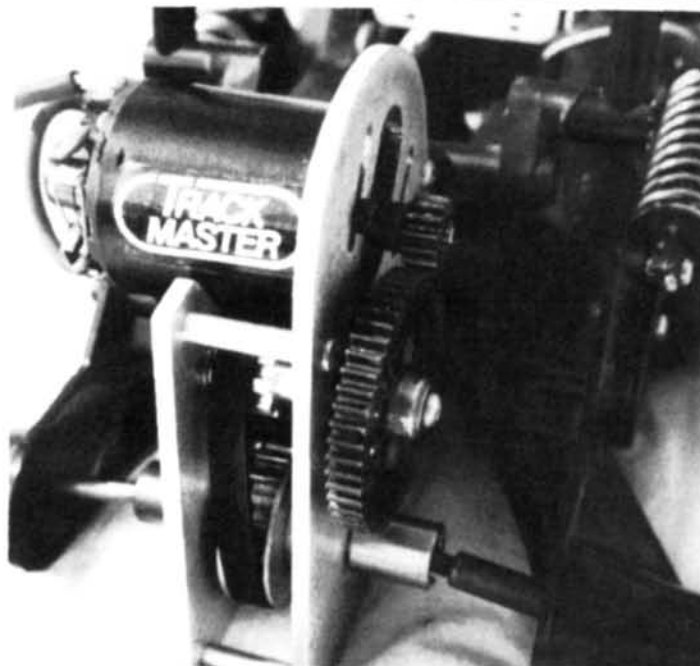
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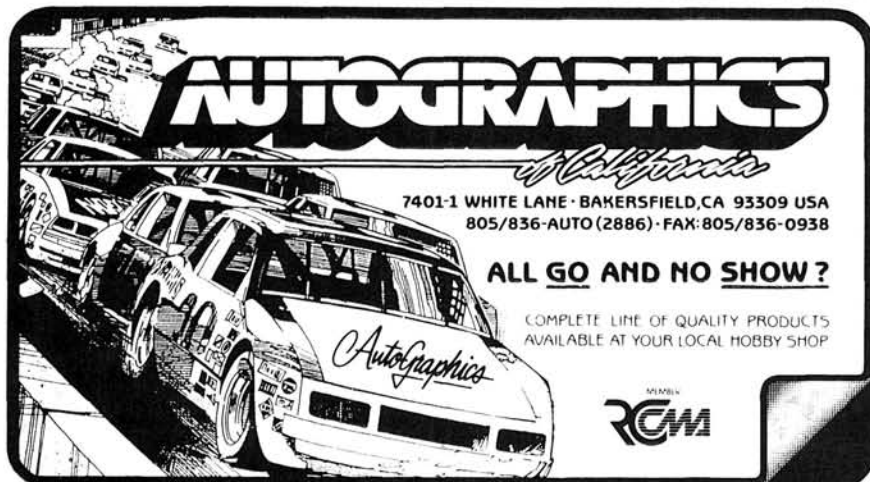
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WEST COAST CHAMPS

(Continued from page 150)

backing this up with a blistering 13-lap run in the A-Main!

Craig Lair must have felt lonely on the drivers' stand during the Main. Starting fourth on the grid, Lair's A&L/RC10 was the "odd apple" in the A-Main basket of JR-X2s, and it was eventually blown away. Reed won the race, and he finished his grand performance by breaking the 12-lap "barrier" for this class and running a full lap on the field! Qualifying 2nd and 3rd, Guy Merrick and Dennis Taylor traded places in the Main as Taylor finished 2nd and Merrick placed 3rd.

● **4WD OPEN MONSTER TRUCK:** NORRCA's newest class—4WD Open Monster Truck—might have had only six entrants, but they were some of the hottest drivers around! Even John Gudvangen Sr. was seen on the drivers' stand with radio in hand. (Gil "Pops" Losi Sr. was also competing in the Open Monster Truck Class). Kyle Reed posted the TQ time of 12/4:18.42, but it was MIP's Eustice Moore who stole the show in the final race of the day!

For the first half of the A-Main, Reed enjoyed a comfortable lead, and then a back-marker took him out and Moore

(Continued on page 156)

CAR ACTION EAST-WEST OVAL SHOOTOUT

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October 13, 14, 15

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\$40, Stock Class with handout Trinity Speedworks Motor

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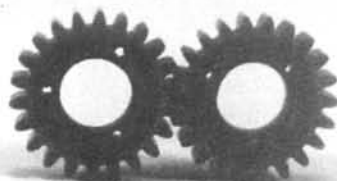
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WEST COAST CHAMPS

(Continued from page 154)

assumed the lead. Moore drove smoothly and steadily (your only option when in front of Reed!) and there just wasn't enough time left for Reed to catch him. Moore took the win ahead of Reed in 2nd and Tom Cox in 3rd.

The two-day event ran like clockwork thanks to NORRCA and its consistently reliable AMB scoring system. Credit also goes to Mr. Warren Reed, proprietor of RCRC of Riverside, who quickly solved problems as soon as they arose (e.g., the smoke bomb that went off in the pits!). Thanks also to Team Losi and JG Manufacturing for making this event possible. ■

RCRC SUPER MOD

(Continued from page 94)

hand-wound 14-turn, double-wind, for awesome mid-range power and top end.

PERFORMANCE: Well, the RCRC Super Modified RC10 sure looked super as it sped around the parking lot. The only real problem was the shock angle created by mounting the shocks on the roll cage: The straight, up-and-down angle made the shocks too stiff. A change in shock oil

(Continued on page 158)



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RCRC SUPER MOD

(Continued from page 156)

made all the difference, and the Super Modified stayed glued to the ground.

The same chassis, roll cage and rear nerf bar can be used as a sprint car. In fact, John "Hammer" Smith, the '88 and '89 ROAR Dirt Oval National Champion, uses the Super Mod roll cage on his

sprinter because it's lower than most sprint-car roll cages.

This kit gives you an inexpensive way to convert your RC10 into a low-slung, open-wheel, oval enforcer, but to make this conversion easier on the beginner, some informative instructions are really needed. RCRC: Are you listening?!

*Here are the addresses of the companies mentioned in this article:

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DIRT DIGEST

(Continued from page 126)

you a slight advantage going into a turn, but the trick is going to be to give it an unfair (but legal) advantage wherever else possible.

If I finish by next month, you'll see it first, and maybe I can even get Bob to give

us some more gas. You can rest assured that, no matter what, there will be *something* here, so keep those cards and letters coming to us kindly folk at "Dirt Digest."

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(Continued on page 178)

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(Continued from page 176)

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(Continued on page 180)

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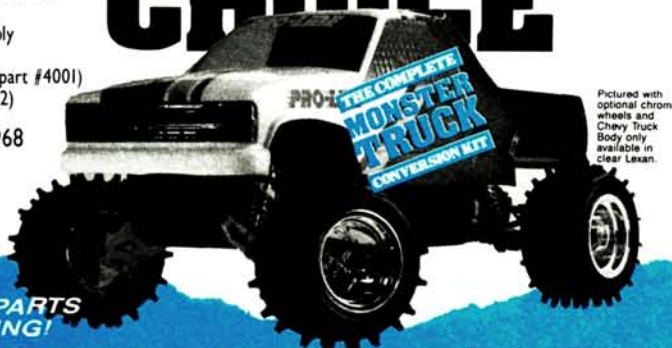
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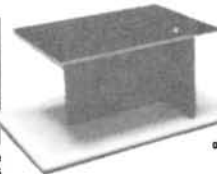
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